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NORMAL VARIATIONS OF THE T WAVE SEEN AMONG SOLDIERS

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Electrocardiographic abnormalities are now being reported in young individuals in whom thorough investigation has revealed no organic heart disease, and in whom such specific infections as rheumatic fever and syphilis, were ruled out. A review of the 2,480 electrocardiograms at the Station Hospital, Fort Jackson, South Carolina, was impressive in regard to the incidence of T wave changes in the young age group. Ferguson and O'Connell[1] reviewed 1,812 tracings of midshipmen at Annapolis. They reported inverted to diphasic T waves in lead II, but were not able to correlate these findings with the history, physical examination and other laboratory studies. They concluded, therefore, that abnormal electrocardiograms were not infrequently found in the absence of demonstrable organic heart disease in this age group. They explained these abnormalities on a functional rather than organic basis. H. E. Hoff and L. H. Nahum,[2] in a series of experimental studies with animals, demonstrated that positive T waves of animal hearts could be inverted by the application of potassium chloride to the pericardial surface. Similar T wave changes were noted by hot and cold applications. They further noted that the abnormal electrocardiographic findings after the application of potassium chloride, heat and cold, that the epicardial surface returned to normal after the effects of these substances wore off. It is thus apparent that T wave changes may be produced by factors other than the commonly accepted organic diseases.

Many theories have been propounded to explain the cause of T wave inversion in the absence of organic heart disease, but in my opinion no single theory can account for all changes. It is accepted that physiologic factors may produce T wave changes. This has been demonstrated in some of the cases presented in this paper. The most commonly accepted cause of reversible T wave changes not associated with organic heart disease, is rotation of the heart on its vertical axis. I have noted several cases, showing T wave inversion on routine tracings become positive by repeating the tracing during forced held inspiration and forced held expiration, and have also noted T wave changes when an individual was placed from a recumbent to a sitting position. White, Chamberlain, Graybiel[3] and others have previously called attention to this. Tobacco smoke and autonomic nervous system imbalance are also capable of producing T wave changes. Thompson,[4] in the March, 1943 issue of the American Heart Journal, reemphasized hyperventilation as a cause of reversible T wave changes. Paul White[5] in a recent article on Neurocirculatory Asthenia (Irritable Heart of Soldiers, Effort Syndrome) pointed out that inverted T waves not on an organic basis are seen in some cases of neurocirculatory asthenia and may lead to an erroneous diagnosis of heart disease. Caroline Bedell Thomas,[6] in an excellent paper regarding electrocardiographic abnormalities in the young states that, "There are a number of

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physiological mechanisms which may alter the electrocardiogram sometimes to an abnormal degree and that in the younger age group in which degenerative disease of the myocardium is rare, the likelihood is that a given abnormality is a physiological variation rather than an evidence of a pathologic lesion."

It is felt that this subject is of particular interest at this time because of the number of young men seen by selective service physicians, and medical officers in Army and Navy Hospitals where this problem is encountered.

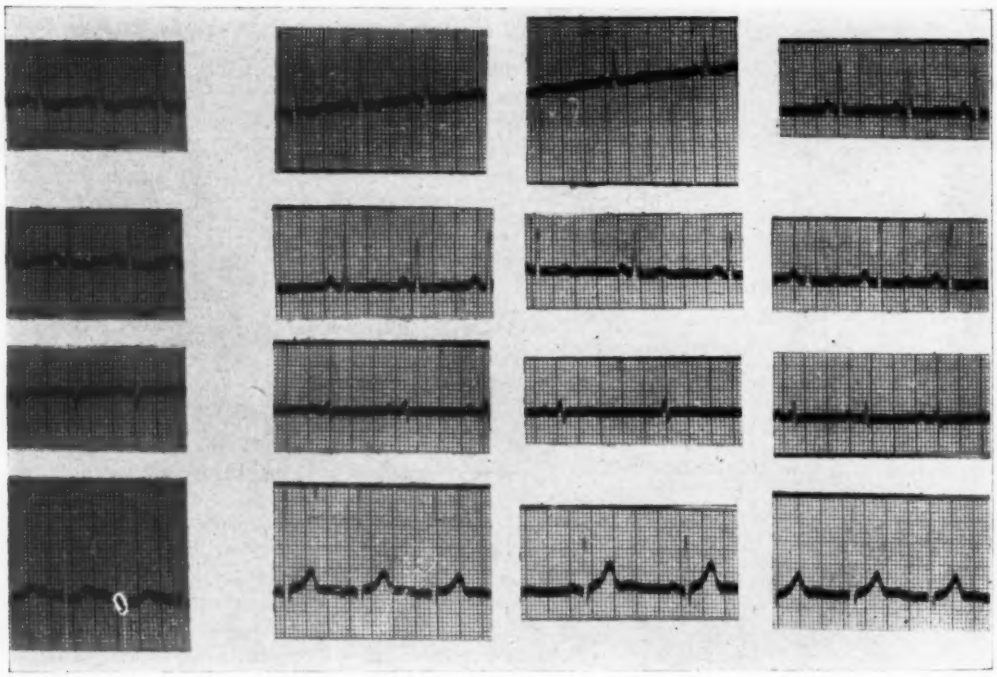
CASE No. 1

K. P., a white male, aged 26, was examined on February 14, 1943. The patient was told in 1941 for the first time that he had a fluctuating blood pressure. Prior to that time he was asymptomatic. For the past year he has been complaining of a tired feeling and slight dyspnea after exertion. Physical examination revealed a well developed, white male, who did not appear ill. Cardiac examination revealed no abnormalities. No evidence of decompensation. Blood pressure, initial reading 160/90, subsequent readings at ten minute intervals 150/90 and 130/85. X-ray revealed the heart and aorta to be of normal size and shape. Temperature 98.4 F., sedimentation rate 7 minutes, white blood cells 7,000.

Electrocardiogram, initial tracing February 9, 1943: T waves diphasic to inverted in leads I and II. Flat to inverted in lead III. These findings are suggestive of myocardial disease but may be of no significance. Electrocardiogram on February 10, 1943: With head and chest lowered and during deep held inspiration and forced held expiration, the T waves that were diphasic to inverted became positive.

DISCUSSION

This case is presented to demonstrate the necessity of serial tracings and records taken during inspiration and expiration with the head and chest lowered in order to determine T wave changes due to abnormal cardiac rotation or position rather than to intracardiac lesions.



CASE 1

Reading across the page in this and subsequent illustrations are the four standard leads.

Column 1, made February 9, 1943, shows inverted to diphasic T waves in leads 1 and 2. Flat T waves in lead 3. Column 2 is normal. Columns 3 and 4, made one day later, show the T waves formerly inverted became upright with inspiration and expiration tests.

CASE No. 2

R. J. S., a white male, aged 21, who, for the past 11 years, that is, since the age of 10, has had attacks of localized, precordial pain and palpitation occurring subsequent to strain, lifting or moving heavy objects and after severe exercise. The pain persists for periods varying from five minutes to three hours. Considerable relief is obtained when patient lies on his back. After an attack, if he lies on his left side he has a dull aching sensation over the precordium. He has noted no change in the character, severity or duration of paroxysms of pain since the onset 11 years ago.

Physical examination revealed a well developed, asthenic individual, who did not appear actually ill. There was a soft, inconstant, apical, systolic murmur not transmitted to the axilla or the back; no thrill, no cardiac enlargement; no signs of cardiac decompensation. Blood pressure 128/65. Pulse rate 80, rhythm regular, temperature 98.4. Remaining part of physical examination revealed no abnormal findings.

Laboratory: X-ray of chest showed the lung fields to be clear. The heart and aortic shadows are normal. Urinalysis—essentially negative. Blood Kahn—negative. White blood cells 7,100, red blood cells 4,350,000. Sedimentation rate 9 mm. (Wintrobe). Blood cholesterol 255.

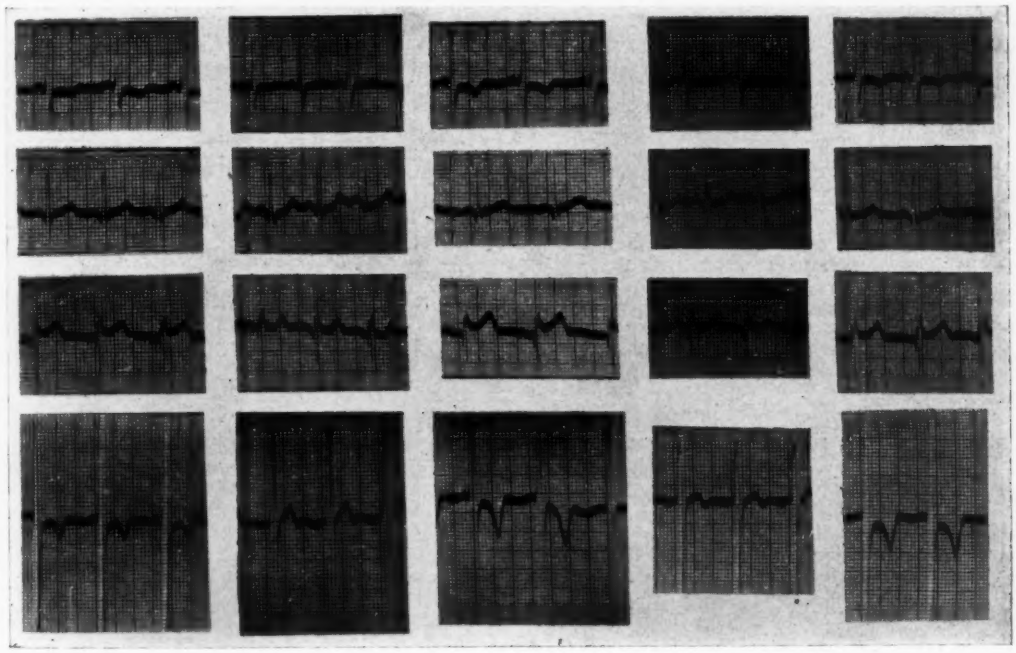
Electrocardiogram on January 1, 1943: Rate 90, rhythm regular, P-R interval .16 sec., P-normal, depressed S-T segment in lead I, elevated S-T segment in leads II and III, left axis deviation, T waves diphasic in lead I and inverted in lead IV. Impression: Pattern of chronic left ventricular strain.

Electrocardiogram on January 2, 1943: No change, pattern not altered by inspiration and expiration tests.

Serial tracings taken on January 3, 4, 5, 6, 7, 10, 15, 17 and February 1 and 15, showed no change from pattern on January 1, 1943.

Electrocardiogram on January 21, 1943: Rate 115, rhythm regular, P-R interval .14 sec., P-normal S-T segments isoelectric in leads I, II, III, and IV. T wave low to diphasic in lead I, positive in leads II, III, and IV.

One hundred per cent oxygen was given for 15 minutes prior to and during the recording of this tracing; pattern same as January 1, 1943.



CASE 2

Column 1, made January 1, 1943, shows pattern of left ventricular strain. All of tracings over seven week period were same as this tracing except for columns 2 and 4. This pattern was not altered by inspiration and expiration tests. Column 2, made three weeks later, shows the effect of amyl nitrite given before and during recording. Rate 115. Column 3, made the next day, shows a result of inhalation of 100 per cent oxygen 15 minutes before and during recording. Column 4, made February 8, 1943, is a comparatively normal tracing for no apparent reason except increase in cardiac rate. Column 5 is the final tracing showing pattern of chronic left ventricular strain.

DISCUSSION

The tracing represents the typical pattern of chronic left ventricular strain described by Barnes, and Whitten,[7] L. N. Katz[8] and others. Whereas the tracing of this 21 year old patient is typical for the description of chronic left ventricular strain, there is an absence of hypertension and left ventricular enlargement, one of which or both are commonly regarded as being associated with the pattern. It is different from the classical pattern of myocardial infarction. If the history of precordial pain with the electrocardiographic findings is thought due to a progressively narrowing process of the coronaries, we would have to assume that the narrowing was sufficiently advanced at the age of 10 to produce symptoms. It is felt that this is a possibility but the likelihood of such being the case is rather improbable.

The absence of hypertension and evidence of cardiac enlargement with the lack of progressive alterations of the pattern over a period of seven weeks' observation in an individual of this age raises some doubt as to whether the findings are attributable to an organic lesion. A tracing taken subsequent to inhalation of amyl nitrite was normal. From this, one would consider the possibility of vasospasm of the coronaries with dilation of the vessels occurring subsequent to the use of the drug accounting for the normal tracing. However, the fact that the chronic left ventricular strain was present with all serial tracings over a period of seven weeks, except for the tracing taken after amyl nitrite inhalation and on one other occasion January 21, 1943, when for no apparent reason, except for an increased rate, a normal tracing was recorded, would speak against a vasospastic condition.

It must further be noted that during the amyl nitrite inhalation and on January 21 waves at this time were altered and S-T waves at this time were altered and S-T segments became isoelectric. The increased rate may have been a contributing factor for it is known that T waves can be affected by increased rate.

The possibility of a congenital anomaly of the coronary vessels such as an atresia was strongly suggested. Were this the cause, however, one would expect the findings to be constant, whereas on two occasions comparatively normal tracings were obtained.

It is felt that this case definitely presents a diagnostic problem. I have considered strongly the possibility of congenital coronary anomaly, vasospastic coronary disease and progressive coronary narrowing. Hypertension and demonstrable ventricular enlargement have been ruled out. Because of the scarcity of clinical material found in reviewing the literature regarding the possibility of this particular type pattern being associated with a functional condition, it was felt that the individual should be managed as though the tracing was abnormal and indicative of myocardial disease. Although the probability is that the tracing is abnormal, it is felt in the light of his age, clinical and laboratory studies with particular regard to the serial electrocardiographic studies and from what we have seen in the electrocardiograms of the younger age group, that a physiologic or functional factor cannot be satisfactorily ruled out.

CASE No. 3

S. L. G., a white male, aged 23, was admitted to Station Hospital, Fort Jackson, July 17, 1942, complaining of attacks of dizziness, shortness of the breath, weakness, precordial pain, palpitation and numbness of the hands, arms and fingers. These symptoms usually appeared after moderate exertion such as hikes, obstacle courses or long drill periods. However, he has had attacks that were not preceded by effort. The above complaints were first noted in 1938.

Physical examination revealed a well developed white male, who appeared considerably apprehensive and nervous. Blood pressure was 185-140/90-80, pulse rate 100, respiratory rate 22 and shallow. No abnormality of heart sounds, no murmurs, shocks or thrills could be elicited. Cardiac borders were within normal limits and there was no evidence of cardiac decompensation. Thyroid gland was not palpable. Hands and feet were moist.

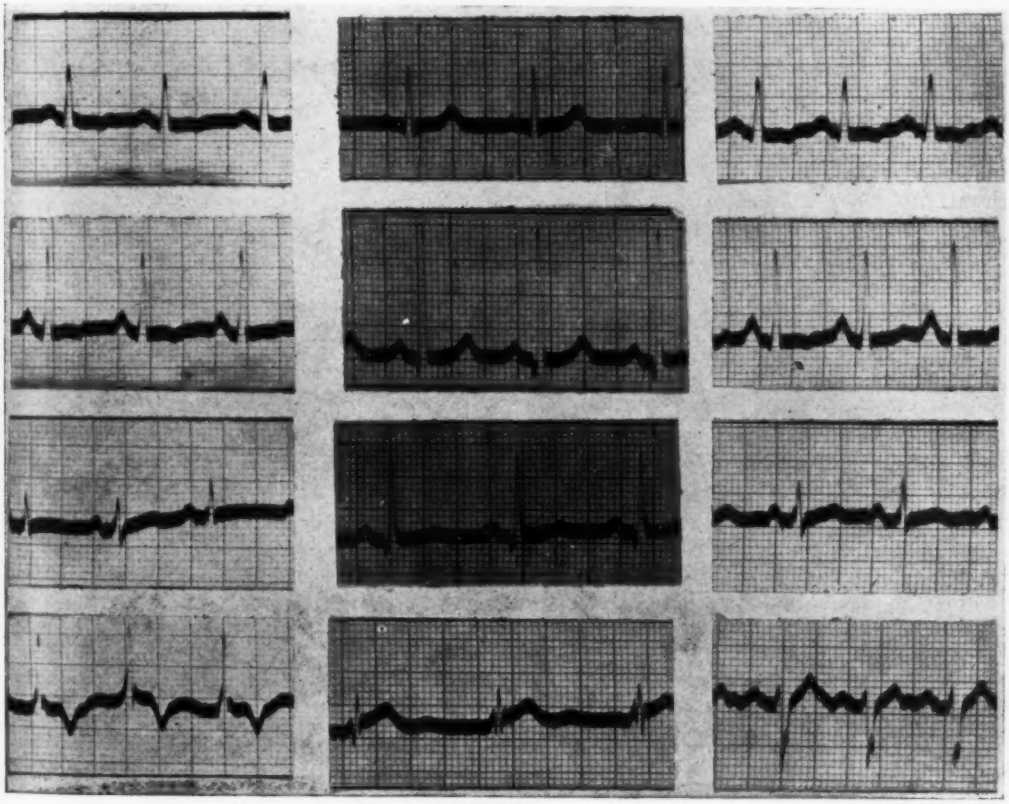
Laboratory: Electrocardiogram on July 20, 1942, rate 100, rhythm regular, normal P waves, PR interval .16, inverted T in leads I and II, low voltage in lead III, prominent inversion of T in lead

IV. X-ray of chest on July 18 showed heart borders within normal limits. Urine concentration test—normal; specific gravity 1.030, urinalysis essentially negative. Blood N. P. N.—35. Blood Kahn—negative. Basal metabolic rate—unable to obtain adequate record because of instability of patient at time of tests.

COMMENT

This patient is extremely apprehensive and nervous. He has a labile blood pressure and pulse. Clinically he is typical of the neurocirculatory asthenic group and subject to sympathetic nervous system influences. Serial electrocardiograms taken July 24, 1942, August 4, 1942, and August 15, 1942, revealed only slight variations from the initial one taken July 20, 1942. The heart rate varied from 100 to 115 at time the above recordings were made. During his course in hospital we had several personal interviews with the soldier and were able to obtain a definite lowering of blood pressure and pulse to within normal limits. Blood pressure variations 210/100 to 140/80. Pulse 120 to 82. However, at no time were we able to obtain relaxation when the electrocardiograms were taken except by use of sedation.

With complete relaxation and subsequent slowing of pulse rate obtained only by the use of intravenous sodium amytal was I able to get a normal electrocardiogram. At this time the rate was 75, PR .18, T in leads I, II, III and IV upright. Tracing repeated one week later without sedation showed an abnormal pattern similar to those previously described. I, therefore,



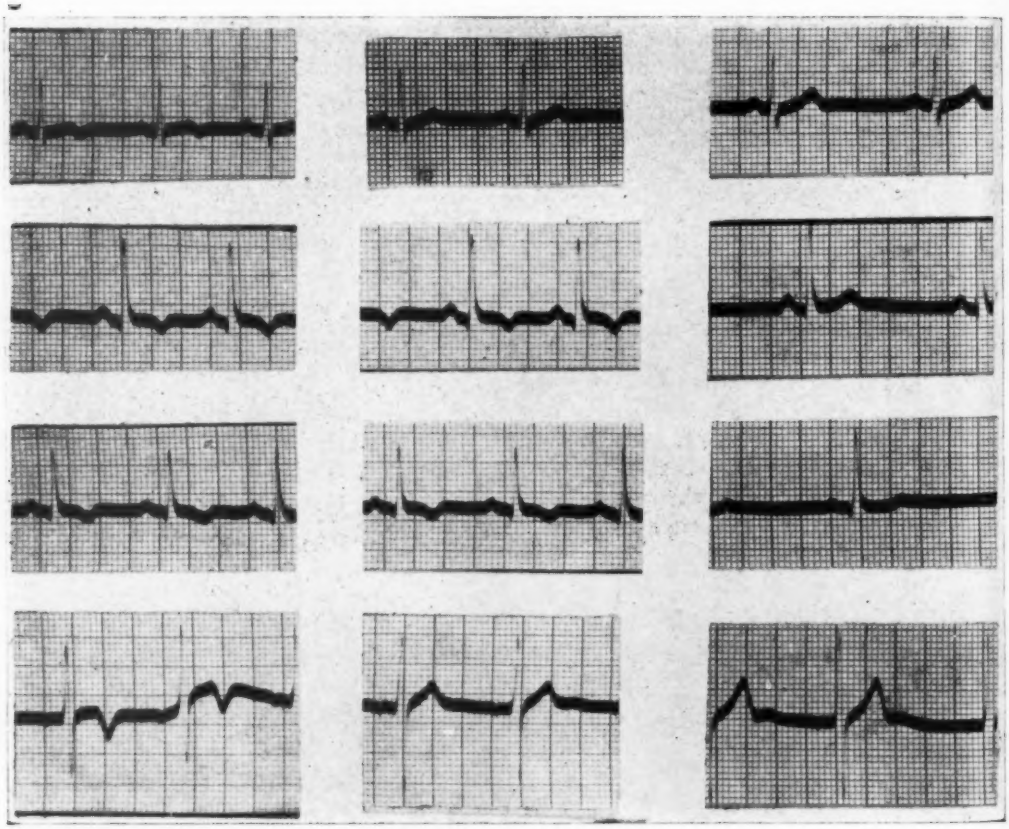
CASE 3

Column 1, made July 20, 1942, shows diphasic to inverted T waves in leads 1, 2 and 4. All of serial tracings over a period of seven weeks, except for column 2, similar to this tracing. Column 2, made August 21, 1942, with intravenous sedation adequate relaxation obtained. Column 3, made three days later, shows without sedation a tracing similar to that made on July 20.

wish to emphasize the factor of anxiety and rapid heart rate as being a possible influencing factor on electrocardiographic patterns and one to consider before final evaluation and significance of T wave changes are to be made. In this particular case, where respiratory movements were rapid and shallow, the factor of hyperventilation can be considered as a contributing influence.

CASE No. 4

A. B. C., a white male, aged 21, was examined on January 29, 1943. Since the winter of 1939, that is, since patient was 17 years old, he has had attacks of localized, precordial pain and palpitation. The attacks last for periods varying from 15 minutes to 10 hours and are usually brought on with severe exertion, but not infrequently occur when at rest in bed. The onset is usually sudden and the termination gradual. The attending physician, prior to patient's induction into the Army, prescribed inhalation of spirits of ammonia and strychnine, which he states frequently lessened the intensity and duration of the pain. There is no associated dyspnea, palpitation, cough or other symptoms referable to the cardiovascular system. There is no past history of rheumatic fever or any other serious illness. He states that he is nervous. Patient does not appear acutely ill, he is well developed, of asthenic habitus, and appears apprehensive. Physical examination, including examination of the heart, reveals no abnormalities. Blood pressure 120/70, temperature 98.4, x-ray of chest showed normal cardiac shadow. White blood cells 5,000; repeated three days later, 6,000. Urinalysis negative.



CASE 4

Column 1 tracing, made January 29, 1943, shows initial diphasic T waves in lead 1, which are inverted in leads 2, 3 and 4. Column 2, made the following day, shows T waves inverted only in leads 2 and 3. All tracings remained the same as this one over a period of seven weeks except the tracing taken February 4, 1943. T waves were not altered by inspiration and expiration tests. Column influences. Interpretation: no electrocardiographien patient was quiet and apparently free of nervous 3, made five days later, is the tracing taken whc evidence of myocardial disease.

Electrocardiogram on January 29, 1943, showed rhythm regular, rate 88, P normal, PR .16, QRS normal, T waves inverted in leads I, II, III, IV.

Electrocardiogram on January 30 showed rhythm regular, rate 85, P normal, PR .16, QRS normal, T waves inverted only in leads II and III. All serial tracings from January 30, 1943, through March 15, 1943, except those taken on January 29 and February 4, were the same as this pattern. The inversion of T waves in leads II and III was not altered by inhalation and exhalation tests. A tracing taken prior to his discharge from the Army on March 15, 1943, showed no change from tracing taken on January 30, 1943.

Electrocardiogram February 4, 1943: Tracing taken in a. m. shortly after awakening at which time he was quiet and not apprehensive: Rhythm regular, rate 54, P normal, PR .16, QRS normal, T waves upright in all leads. Interpretation: Normal tracing.

DISCUSSION

This patient is young, asthenic, nervous, apprensive and typical of one of the neurocirculatory asthenic group. As recently pointed out by White, Chamberlain, and Graybiel,[3] an individual of this kind with increased autonomic nervous influence is prone to have a sino-auricular tachycardia and not infrequently T wave flattening or inversion and unassociated with organic heart disease.

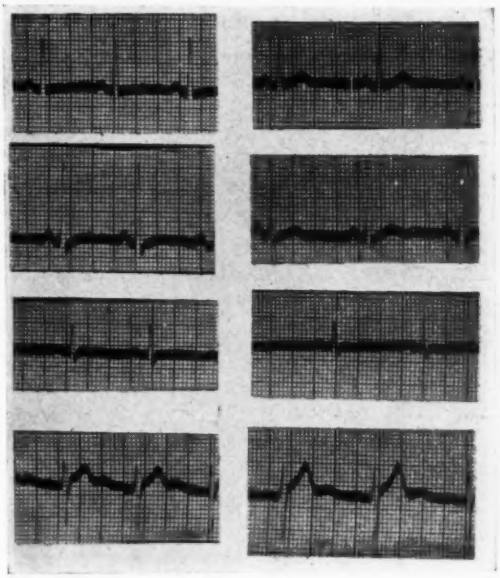
The normal tracing with relatively slow cardiac rate (54) obtained on February 4, was taken in the morning after the patient had a good night's rest. The recording was made before he arose from bed, at which time he was quiet, calm and apparently free of exciting and nervous influences. This is the only time we were able to obtain such favorable conditions and a normal tracing.

The fact that the T waves were inverted in standard and precordial leads on January 29, and inverted only in leads II and III the following day, in the absence of any change in the clinical or other laboratory studies, further adds to the questionable significance of the T wave inversion in this case.

The T wave changes that occurred during the seven weeks' observation of this man in the absence of fever, leukocytosis, increased sedimentation rate, x-ray or fluoroscopic evidence of cardiac abnormality with no past history of rheumatic fever and no abnormal cardiac findings on physical examination, would tend to rule out a rheumatic infection and other specific infectious processes.

CASE No. 5

R. M., a white male, aged 22, was admitted to hospital complaining of bilateral deafness. He was admitted to E. N. T. service and a diagnosis of otitis media, chronic non-suppurative, severe, bilateral, cause undetermined and defective hearing, bilateral, secondary to above diagnosis, was made. Because of an admission blood pressure determination of 159/90 a cardiac consultation was requested. The opinion of consultant was as follows: No previous history of hypertension, no symptoms referable to cardiovascular system and no past history of rheumatic fever. Physical examination revealed a well developed, well nourished male who had defective hearing. Successive blood pressure readings at five minute intervals were 150/90, 140/88, 138/84. No abnormalities noted on cardiac examination. Opinion: No evidence of cardiovascular disease. Laboratory: Urinalysis negative, specific gravity 1.030, red blood cells 4,970,000, white blood



CASE 5

Column 1, made February 3, 1943, shows diphasic to inverted T waves in lead 1 with low voltage to flat T waves in leads 2 and 3. Column 2, made the following day, indicates normal T waves in leads 1 and 2.

cells 7,400, Kahn negative. X-ray of chest showed no enlargement of cardiac shadow.

Electrocardiogram February 3, 1943: Rate 86, rhythm regular, PR .16, P normal, QRS normal, T waves diphasic to inverted in lead I and varying in form in successive cycles of the same lead, slightly low amplitude in lead II and flat in lead III. Recommended repeat tracing.

Electrocardiogram February 4, 1943: Rate 70, rhythm regular, PR .16, P normal, QRS normal, T waves that were diphasic to inverted in lead I on tracing taken February 3, are now upright. T waves that were flat in lead III are now positive.

Electrocardiograms on February 7 and 8 showed no change from tracing taken February 4.

DISCUSSION

This case again demonstrates the necessity of serial tracings and shows the significance of diphasic to inverted T waves that vary in form in successive cycles of the same lead.

COMMENT

Five cases are reported in young soldiers demonstrating interesting electrocardiographic changes commonly regarded as indicative of myocardial disease, in whom there was found no conclusive clinical or other laboratory evidence to bear out such a diagnosis. In four of the cases S. L. G., A. B. C., P. K. and R. M., the reversibility of the T waves was demonstrated. Observations presented lead to the conclusion that the changes were not related to an organic lesion. In one of the cases R. J. S., the probabilities are that the electrocardiographic changes are due to a physiologic factor. If the changes in the case of R. J. S. are due to a congenital anomaly or to organic coronary disease they are of particular interest because of the infrequency which such tracings have been recorded in the younger age group.

The following factors are considered important in the evaluation of T wave changes:

1. Character of the waves: It is important to determine whether the change is of the minus-plus type or the plus-minus type (cove plane T wave of Pardee). According to Ashman and Hull,[9] the form minus-plus, particularly when the downward portion is shallow, is of less pathologic significance than the plus-minus types, and may occasionally be seen in any limb lead in an apparently normal heart.

2. Consistency of changes: Waves that vary in direction and amplitude in successive cycles of same lead are less significant than fixed changes in same lead.

3. Rotation of the heart: Change of body position, inspiration, expiration and less frequently, deformity of thoracic cage can affect the T wave.

White and his associates have stressed the importance of change in position of the heart in the thorax accounting for T wave abnormalities.

Not infrequently T waves that are diphasic or inverted become upright merely by repeating the tracing with the patient in the Trendelenberg position, and making records during deep held inspiration and forced held expiration.

4. Effect of anxiety and rapid heart rate: Diphasic or inverted T waves with rapid heart rates may become upright when relaxation and subsequent slowing of the heart rate ensues. On occasions I have had to use sedation to obtain the desired relaxation. Various changes in the T waves may be associated with changes in heart rate. The effect of increased sympathetic activity in lowering or inverting the T wave has been recognized.

5. Serial tracings: The fallacy of accepting a single tracing in a young individual as indicative of myocardial disease, cannot be over-emphasized. Diphasic to inverted T waves in leads I, II, III, and IV on routine tracings may become upright on tracings repeated the following day for no apparent reason, that is, in the absence of a history or physical findings suggestive of cardiovascular disease.

6. The clinical picture.

7. I have excluded in this presentation, organic cardiac lesions causing T wave changes. However, for the sake of completeness some of the extracardiac conditions that may produce reversible heart dis-

ease with subsequent electrocardiographic changes are mentioned. These are endocrinopathies, avitaminosis, blood dyscrasias, acute toxic processes, drugs, pulmonary conditions causing abnormal cardiac rotation, and so forth. These should be considered in the final evaluation of the T wave changes.

In conclusion, the necessity of very careful evaluation of T wave abnormalities in the younger age group is emphasized.

It is felt that various procedures to determine reversibility of T wave inversions should be carried out routinely. Finally, it is emphasized that not infrequently T wave changes suggestive of myocardial disease particularly in the young may be associated with normal physiologic variations rather than with organic lesions.

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IMPORTANT CONSIDERATIONS IN THE TREATMENT OF TOXIC GOITER*

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Although the prophylactic use of iodine in iodized salt has been reported as decreasing the incidence of toxic goiter in certain localities, we have not noticed any lowering of incidence in the Chicago area, which is in a goiter belt. Cases of toxic goiter, therefore, still constitute a large percentage of the admissions to the hospitals in certain localities. The diagnosis is made with little difficulty in the patients who have thyrotoxicosis of severe degree. On the other hand, differential diagnosis may be very difficult in patients with mild hyperthyroidism, since the disease may simulate such diseases as tuberculosis, leukemia, endocarditis, or neurocirculatory asthenia.

A detailed discussion of diagnosis will not be considered in this presentation, but a few features of differential diagnosis will be considered. In the table below one notes, for example, that hyperthyroidism of the

TABLE 1

Symptoms or signs	Toxic goiter	Neuro-Circ. asthenia
Nervousness	Yes	Yes
Weakness	Yes	Yes
Weight loss	Yes	Yes
Increased sweating	Yes	Yes
Sleeplessness	Yes	?
Tachycardia	Yes	Yes −
Tremor	+ +	+
B. M. R.	25 to 70+	20 to 30+
Cardiac output	Increased	Normal
Heat intolerance	Yes	No
Appetite	Increased	Normal or decreased
Attitude to activity	Desires	Avoids
Attitude to work	Willing	Reluctant
Eye signs	+ or −	No
Goiter	In 80 to 90%	No
Response to iodine	+	No

*Read before the Seventh Annual Meeting of the New Orleans Graduate Medical Assembly, March 5-18, 1943.

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mild type is extremely difficult to differentiate from neurocirculatory asthenia.

In the two groups it will be noted that symptoms of hyperthyroidism such as nervousness, weakness, loss of weight and increased sweating are likewise symptoms of neurocirculatory asthenia. If eye signs are present, the diagnosis of thyrotoxicosis can be made, but it must be appreciated that exophthalmos and allied signs are present in toxic goiter in perhaps less than 50 per cent of cases. It should likewise be emphasized that in at least 10 per cent of cases of toxic goiter, there will be no palpable evidence of an enlarged thyroid gland. The attitude of the patient to exercise and work may be very helpful in certain cases since the patient with toxic goiter craves activity whereas patients with neurocirculatory asthenia and many other such diseases shun activity.

One of the most valuable means of establishing the diagnosis is observation on the response of iodine to the symptoms. With practically no exceptions, the symptoms of thyrotoxicosis will be definitely decreased unless the patient has been on iodine therapy recently. If the diagnosis is not clarified after various examinations and tests, conservative management should be adopted, since in such mild cases, delay of operation will not be harmful. It is naturally preferable indeed to postpone operation in such cases, lest thyroidectomy be performed on a patient with pulmonary tuberculosis or some other such disease. The seriousness of such an error can readily be appreciated.

PREOPERATIVE PREPARATION

Administration of Iodine: As soon as a basal metabolic rate has been obtained, the patient is put on iodine therapy. The preparation usually used is Lugol's solution in a dose of 5 to 15 minims three times a day. Although it is usually considered that the optimum beneficial effect is obtained in ten or twelve days, it is usually preferable to extend iodine therapy longer than this in severely toxic patients. With few exceptions, severely toxic patients will be much better operative risks if iodine therapy is extended several days beyond this period. Opinions differ as to the value of cessation of iodine therapy when through uncontrollable circumstances the drug has been given for several weeks or months, or when the patient does not appear operable with an extended interval of therapy. The author prefers to keep such patients in the hospital under observation, maintaining iodine therapy, hoping to catch the patient in a remission when operation (at least removal of one lobe) will be permissible. I admit, however, that on certain occasions administration of iodine after a rest period of several weeks may at times be a wise procedure.

Increased caloric intake: One of the most common errors made in the treatment of severe thyrotoxicosis is failure to give the patient sufficient food. I wish to emphasize very emphatically that it is not sufficient simply to tell the patient to eat more food. If the patient is severely toxic and of doubtful operability, the utmost value of increased caloric intake must be utilized, since gain in weight is so essential to achieving the physical status of operability. It is a fairly safe and advisable procedure to recommend a 5,000 calorie diet for these severely toxic patients and actually to increase it to 6,000 if the patient will eat that amount. Rarely indeed will they fail to eat 5,000 calories, except then they are having anorexia and perhaps vomiting with diarrhea which in reality is an expression of a crisis. The diet should be a balanced one, containing a liberal quantity of protein.

Conservation of energy: Patients with thyrotoxicosis should not be working, particularly if their work is physical labor. Even work limited to mental exercise is undesirable if extended over several hours. The utilization of the patient's time in duties or pastimes which help eliminate the monotony of the passage of time is, however, desirable. The patient should be allowed to undertake moderate exercise. Only when the patient is extremely toxic, approaching the crisis stage, or when cardiac

decompensation is present is complete bed rest indicated. Patients with a significant amount of thyrotoxicosis should be encouraged to take an afternoon nap of at least two hours.

Elimination of psychic trauma: A review of the history of patients with toxic goiter reveals a surprisingly large number of them who date their onset to a serious illness or accident in the family, perhaps associated with financial worry. For example, a mother with three or four sick children who is still trying to carry on social and household duties will have her symptoms severely aggravated by these activities. Elimination of such sources of worry and undue expenditure of energy will do much indeed toward an efficient preparation for operation. When home conditions are unsatisfactory, hospitalization may, therefore, become a necessary part of treatment.

Sedation: Since patients with thyrotoxicosis sleep poorly and need an excess amount of rest, including sleep, the administration of sedatives becomes an important phase in therapy. Most any of the relatively harmless sedatives are satisfactory. The one commonly used is phenobarbital in a dose of one-half grain two or three times a day, giving perhaps most of it in the evening. This will relieve a great deal of apprehension and allow the patients to rest more effectively as well as allow them to get more sleep.

Treatment of complicating diseases: The importance of emphasizing the treatment of complicating diseases probably need not be discussed. However, we should call attention to the fact that diseases such as diabetes, or urinary infection may complicate thyrotoxicosis just as other diseases. They must be treated very effectively since they add a load to the patient's physical difficulties and detract from operability. The most common complicating disease will of course be cardiac decompensation, as particularly noted in toxic nodular goiter. In such cases, bed rest is desirable. The use of digitalis or quinidine in such patients is somewhat controversial, but in general neither is given except in certain cases of fibrillation. The use of a diuretic such as salyrgan may be extremely desirable, in cardiac decompensation with edema, particularly if there is no significant renal damage.

Miscellaneous therapy: Conforming to the experiences of Curtis and associates, who demonstrated a negative calcium balance in hyperthyroidism, calcium therapy is desirable. It is probable that most vitamins are utilized at a more rapid rate in thyrotoxicosis than in other diseases. This appears to be true particularly of vitamin B_1. It therefore appears desirable to give large doses of B_1, especially in severely toxic patients.

PREREQUISITES FOR OPERATION

In an endeavor to teach students to measure operability and to determine when a given patient was ready for operation, it was discovered that adoption of mathematical principles clarified this problem to a marked degree. It can be assumed that all clinicians have a way of their own of determining when a patient is ready for operation. In general these prerequisites will be found to fit in to a great extent with the prerequisites described below in a mathematical way.

Gain in weight: Perhaps the most important prerequisite for operation in severely toxic patients is a gain in weight. As stated before, rarely will a caloric intake of less than 5,000 calories achieve this standard in adults who are severely toxic. The administration of a liter of 10 per cent glucose every day may assist somewhat in achieving a gain in weight. The amount of weight gain required is of course dependent upon the individual case. A patient who has lost no more than eight or ten pounds need gain no more than perhaps two or three. On the contrary, a patient who has lost 50 or 60 pounds and is in a very poor state of nutrition should gain ten or 20 pounds before he can be considered to be in a satisfactory state of operability. The patient's strength should return to the point that he is able to walk about the ward without undue fatigue.

Resting pulse rate should be below 110: The pulse rate is a fairly accurate index of toxicity, but the influence of excitement or exercise on the pulse rate should always be kept in mind. It is preferable to have the resting pulse rate below 110. If it is above 120, the patient is not operable, except in certain cases when a rapid rate accompanying fibrillation need not necessarily be an expression of severe toxicity. The reaction of the pulse rate to minor excitement is frequently a good index to the degree of toxicity. In other words, if the pulse rate at rest is 108 but flares to 130 or 140 when the patient is subjected to some slight excitement such as talking to a stranger, it is usually an indication of a greater toxicity than other manifestations indicate.

The basal metabolic rate after iodine therapy should be less than 50 per cent above normal: Everyone is aware of the fact that the basal metabolic rate cannot be considered as direct evidence of degree of toxicity. Yet there is little doubt but what these readings, in general, are of definite value so long as other information is likewise considered. In other words, with few exceptions, patients with a basal metabolic rate of more than 50 above normal after iodine therapy, are apt to be severely toxic.

Response to iodine therapy: As previously stated, iodine therapy must be continued at least two weeks in the severely toxic patient before operation is considered. After iodine therapy, the average patient will exhibit a definite improvement in symptoms, and the basal metabolic rate will drop 20 to 50 per cent. Ordinarily, if a severely toxic patient obtains only slight improvement following iodine therapy, there is indication that operation may be poorly tolerated.

No untreated complications: Complications such as diabetes or cardiac decompensation should be adequately treated and under control before operation is undertaken.

PRECAUTIONS IN OPERATION

The decision as to time of operation is obviously a very important one from the standpoint of mortality rate. It must be emphasized that patients with toxic goiter have periods of exacerbation and periods of remission. Likewise, therapy may be altered in case certain routine procedures appear not to be effective. In spite of the fact that the physician has made a complete study of the patient's condition, errors regarding operability can be made. In our clinic when we have a patient who is doubtfully operable, the patient is prepared for operation and sent to the operating room as a trial procedure. If his pulse rate rises to above 140 and does not come down to less than 130 under proper anesthesia, he is considered a poor operative risk. If the pulse rate is much higher than this, he is sent back and submitted to another trial at a later date.

Anesthesia: I prefer ethylene anesthesia. This gas allows the use of more oxygen than does nitrous oxide and does not have the effect on the heart that is sometimes observed with cyclopropane. Although the effect on the heart with cyclopropane may be serious, yet it may produce a bradycardia or partial heart block of atypical character which may give one a sense of false security because of the decrease in heart rate. I do not believe that local anesthesia is a satisfactory anesthetic for routine purposes, since apprehension during the operative procedure is difficult indeed to eliminate. Obviously, to any patients with mild toxicity, this added apprehension will not be of any concern. However, in patients who are severely toxic and doubtfully operable, this apprehension which is an extra load on the cardiac reserve may be sufficient to reflect disadvantageously on the mortality rate. As previously stated, on numerous occasions patients were sent to the operating room for trial observation but returned to their rooms because they had such a severe tachycardia and required so much oxygen during anesthesia that operation appeared unwise. On a few occasions these patients were scheduled for operation two or three days later but they were put to sleep on the ward with intravenous pentothal. This relieves the apprehension and

the consequent severe load on the heart, which I believe may be sufficient to ruin operability. With practically no exceptions, these patients to whom we have given pentothal intravenously as a premedication, retained a satisfactory pulse rate which remained low (that is, below 120) after induction of ethylene. A few years ago avertin was tried in this clinic as a basal anesthetic but its use was stopped because it appeared to exert a slight but definite deleterious effect on many patients of the severely toxic group. I am convinced that sodium pentothal intravenously is a safer basal anesthetic and does not produce the respiratory depression which is sometimes noted following the use of avertin.

Extent of operation: If the patient does not meet the prerequisites previously mentioned, he is not considered a safe candidate for a bilateral thyroidectomy. However, if he meets all except one or perhaps is doubtfully operable for various reasons, the removal of one lobe is considered perfectly safe. I agree with Lahey who is convinced that stage operations in surgical treatment of toxic goiter are at times advisable.

If the pulse rate should go above 130 during removal of the first lobe, the surgeon and anesthetist should give serious thought to the possibility of performing a thyroidectomy on only one side. If the pulse rate of 130 continues upward and reaches 140 about the time the first lobe is removed, this constitutes a definite indication that the operation should terminate at this point, particularly if the patient is known to be a doubtful case from the standpoint of operability.

I believe that a fairly complete thyroidectomy should be done, leaving the posterior capsule and one to three grams of thyroid tissue with the capsule. The amount of tissue left is determined somewhat by the size of the gland and the toxicity of the patient. In other words, in severely toxic patients with small thyroid lobes, the removal should be fairly complete, allowing perhaps no more than one gram of thyroid tissue to remain with the posterior capsule.

Precautions in technic: Although preoperative preparation and the decision as to the time of operation are perhaps the most important factors in the maintenance of a low mortality rate in the surgical treatment of goiter, the operative technic is of course important. Only in the severely toxic patient is speed of operation really an important item. Since a great many operative complications are the direct result of too much hurry on the part of the surgeon, he should not allow the clock to influence his operation except in the group of severely toxic patients when all trauma must be reduced to a minimum. Although I am not of the opinion that the recurrent nerve must be isolated for its safety, yet the surgeon must at all times appreciate the location of that structure and avoid putting clamps on or near it. Frequently the type of breathing exhibited by the patient under the anesthetic will tell the surgeon and the anesthetist when the nerve has been damaged. Naturally, if the damage has been inflicted by a clamp or proximity of a clamp, it should be removed. If the nerve has not been severed, recovery will take place fairly completely. The time required for recovery varies, depending upon the degree of trauma; I have observed many patients who had temporary palsy which disappeared in a few days.

The postero-medial capsule of each lobe should be left intact so as to preserve the parathyroids. With the knife the thyroid tissue can be shaved so that no more than a couple of grams of tissue remain with the capsule. Shaving the capsule and preserving it in this way, particularly on the medial side, likewise minimizes danger of harm to the recurrent nerve.

Ordinarily we do not cut across the ribbon muscles transversely, but if exposure is poor, we do not hesitate to do so. Furthermore, the surgeon should not feel embarrassed in moving to the other side of the table if exposure on the side opposite him is difficult.

In my experience, non-absorbable suture material is preferable to catgut. Although a few years ago silk was used for thyroid-

ectomies in our clinic, cotton is now the material of choice. Cotton as popularized by Ochsner and associates, is a very satisfactory suture material for this purpose, particularly since it appears to discourage the development of infection, or rather does not encourage it. In two or three hundred cases of thyroidectomies in which silk was used, there were two or three infections, one or two of which drained for several weeks. In an equal number of cases in which cotton has been used, there have been no infections, at least of a severity which would require drainage.

POSTOPERATIVE TREATMENT

Obviously postoperative therapy will differ considerably in the severely toxic group as compared with the mildly toxic group. In either case, the anesthetist or surgeon must be certain that the patient's airway is open and breathing is unimpaired. Allowing the patient to be up in a semi-sitting position with the back rest up adds considerably to his comfort and aids in swallowing.

It is essential that severely toxic patients be given a liberal quantity of fluid, particularly if the weather is warm and the patient is sweating considerably as he is apt to do. He should receive a total of at least 3,000 c. c. on the day of operation, since he will not be able to take much of this by mouth during this period; the intravenous route seems preferable. In the average case a solution of 5 per cent glucose is preferable, although a liter of 5 per cent glucose with saline perhaps should be included. In severely toxic patients the glucose should be of 10 per cent concentration, except that containing saline.

The day following operation, the patient will be able to take considerable fluid by mouth. However, if he is severely toxic, this amount must be measured or approximated as accurately as possible and sufficient glucose given by vein to constitute a total intake of 3,000 c. c. for an adult. Naturally oral intake is encouraged as rapidly as the patient is able to swallow, starting out with liquids and soft food.

I am of the opinion that iodine therapy should be given postoperatively and maintained until all symptoms of hyperthyroidism have disappeared. I realize that the subject is controversial, but it appears to me that if we can minimize the hyperplastic element, the tendency toward recurrence will be minimized. It is well known that of the conservative procedures available, iodine therapy is perhaps the most valuable in the reduction of cellular hyperplasia in the thyroid gland. Since there usually are a few grams of thyroid tissue left, it would appear advisable to strive for production of a resting phase for this remaining tissue, particularly since the operation of thyroidectomy does not eliminate the primary cause of the disease. If the primary cause of the disease (which in reality is unknown) had been eliminated, then the need for iodine would not be present.

In severely toxic patients oxygen therapy should be given as a routine. Ordinarily, the oxygen tent frightens thyroid patients so badly that the use of a nasal tube is preferable although probably not as effective. By utilizing a stream of at least six liters of oxygen per minute, considerable assistance can be rendered the circulatory mechanism. If an oxygen tent is used, it will usually be necessary to explain the situation carefully to the patient to prevent severe apprehension.

Sedation is very important in conserving energy and allowing the patient to obtain ample sleep. Morphine must be used liberally during the first 24 to 48 hours, but obviously the respiratory rate must be watched at all times lest an overdose of morphine depress the respirations and lead to anoxia.

The patient should be watched closely at all times, and symptomatic treatment utilized as indicated. It is particularly important to watch him for any evidence of respiratory obstruction which might be brought about by trauma to the recurrent nerves or by a hemorrhage into the operative area. If the wound is closed without drainage, as is done in our clinic, consid-

erable blood can accumulate with very little external evidence of it. The voice may be extremely helpful in determining possible injury to the nerves, although it is appreciated that many patients have a harsh voice for a day or two following thyroidectomy, even though there has been no injury to the nerve, or respiratory obstruction.

In general there is a tendency for the nurses to place too many blankets over the patient when he returns to the ward. In a room with proper temperature, very little cover should be placed over a severely toxic patient who has just been operated on. Since he is already burning up energy at a terrific rate, nothing more than a sheet and bedspread will be necessary. Too much cover may encourage the development of fever with crisis manifestations.

Patients should be observed for the possible development of tetany. Early symptoms consist of tingling and numbness of the fingers and a positive Chvostek's sign. The first evidence noted by the physician may be an awkwardness in the patient's attempts to use his hands. Carpopedal spasm manifested with or without the aid of a tourniquet is likewise important evidence of the development of tetany. If tetany develops, parathormone should be given immediately. However, recent experience shows that dihydrotachysterol is just as effective as parathormone, and the patient does not become resistant to it after continued therapy as he frequently does after parathormone therapy. In the average case, the use of these two effective agents will be necessary only for a few days. Thereafter, the administration of calcium in the form of gluconate or lactate, along with a liberal intake of milk will be adequate to control the patient's symptoms.

TREATMENT OF CRISIS

Obviously we strive to eliminate the postoperative development of a crisis by proper preoperative treatment and choice of time for operation. In spite of the utilization of the best judgment available, crises of a mild character will develop now and then. However, as Lahey has so emphatically stated, a development of a severe crisis is a definite indication that either too much was done at the operation, or the operation was done at the wrong time.

A rising pulse rate and elevation of the temperature will be early indications of the development of a crisis. Important features in the treatment of crisis are oxygen administration, effective sedation, and ample fluids, particularly a liberal intake of glucose. A fluid intake of 5,000 c. c. may actually be indicated. It will be of advantage to utilize 10 per cent glucose for at least a great portion of this fluid. Administration of sodium iodide intravenously in doses up to one gram once or twice a day is indicated. The patient should be placed in a cold (that is, air-conditioned) room, particularly if the season is summer. As a matter of fact, if a cold room is not available, a severely toxic patient should not be operated on on hot days. Failure to follow this precaution is inviting serious trouble in the severely toxic group. Ice packs and wet towels applied to the skin, perhaps with a fan directed over the patient's extremities, represent substitutions for a cold room. Such measures should be adopted if a crisis develops and a cold room is not available. Adequate sedation, utilizing soluble barbital compounds subcutaneously along with morphine, is very necessary. If morphine alone is used, the dose will usually have to be so large that serious anoxia will develop. Fluid is allowed by mouth but will rarely be retained if given in large quantities, since vomiting is a fairly constant manifestation of crisis. Liberal amounts of calcium and thiamin (parenterally) may likewise be given.

PROGNOSIS AND MORTALITY RATE

In general the mortality rate is directly related to the thoroughness of preoperative preparation of the patient and to the proper choice of time for operation. As stated previously, preoperative preparation should achieve a gain in weight, with a reduction in pulse rate and basal metabolic rate. Stage operation should be utilized when operability is doubtful. I wish to emphasize, however, that stage operation it-

self does not solve the problem of operability. In other words, if a patient is severely toxic and poorly prepared, removal of one lobe may be fatal, just as a bilateral thyroidectomy would be fatal.

As noted in table 2, 833 thyroidectomies have been performed* in the past six and a half years. The mortality rate for the entire series was 1.08 per cent. Strange as it may seem, the mortality rate in the toxic diffuse group was lower than in the non-toxic nodular patients. This is probably explained by the fact that patients with toxic diffuse goiter are usually young, whereas many of the patients who were operated on for non-toxic goiter were aged individuals with a more fragile heart. A

TABLE 2
TYPES OF GOITER AND MORTALITY
(1936 to 1943)

Type	Operations	Deaths	Mortality per cent	
Toxic diffuse	390	3	0.76	1.06
Toxic nodular	264	4	1.5	
Non-toxic nodular	179	2	1.1	
Total	833	9	1.08	

study of the nine deaths reveal that two succumbed to crisis, one to gas gangrene of the buttocks, one to postoperative hemorrhage, one to tetany, one to acute hepatitis, one to a serious glucose reaction, and two to acute heart failure. The latter two patients who died suddenly from acute heart failure had non-toxic goiter. At least three of the four deaths in our series were preventable. Two of them developed crises. Neither of these two qualified for operation from the standpoint of the prerequisites described. They were operated on before we had developed the prerequisites which would have demanded more preoperative preparation in these patients.

In table 3, I have indicated the ratio of white to colored patients in the various groups. Of the entire group 9.1 per cent were colored. There is a slightly lower ratio of colored patients in the toxic nodular group. Surprising as it may seem, we had no deaths in any of the colored patients. This is at variance with experience in the South where reports have indicated a higher mortality rate in the colored patients than in the white patients. It is difficult to arrive at a satisfactory explanation of this variance in mortality rate, unless the fact that a better nutritional status in the Northern negro is possibly an explanation.

*These operations have been performed at the Illinois Research Hospital.

TABLE 3
OPERATIONS FOR GOITER (EXC. CA)
RATIO OF WHITE TO COLORED

	Operations	Deaths
Toxic diffuse	W 350	3
	C 40 (or 10.3%)	0
Toxic nodular	W 247	4
	C 17 (or 6.4%)	0
Non-toxic nodular	W 160	2
	C 19 (or 10.5%)	0
Total cases	W 767	
	C 76 = 9.1%	
	833	

SUMMARY

The most important factor in maintaining a low mortality rate in toxic goiter is adequate preoperative preparation. To aid in teaching students when patients are ready for operation and to aid us in determining time of operation, we have established certain prerequisites which are designed somewhat on a mathematical basis. These prerequisites are: (1) gain in weight; (2) resting pulse rate below 110; (3) basal metabolic rate below 50; (4) response to iodine therapy, and (5) no untreated complications. I am convinced that adherence to rules of this type will maintain a low mortality rate.

END RESULTS IN THE SURGICAL TREATMENT OF GASTRIC CARCINOMA

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The purpose of this paper is to present the results of surgical procedures in the treatment of carcinoma of the stomach. This is a very important and serious condition, for nearly 40,000 persons died of carcinoma of the stomach in the United

states last year.[4] More deaths are due to this form of cancer than to any other single type of malignancy.

HISTORY

Pèan in 1879 is the first person on record as having performed gastrectomy for cancer of the stomach. Unfortunately, his patient died five days after the operation. In 1880 Rydygier repeated this operation, but the patient died within twelve hours. Both these physicians were Frenchmen.

Even before this time Theodore Billroth had come to the conclusion that gastrectomy was the only logical form of treatment, but with typical German thoroughness he performed numerous operations on dogs before venturing to subject human patients to gastric resection. He performed the first successful gastrectomy on a human being in 1881. The patient survived five months. Even today the type of operation that Billroth devised is still being employed, and is called by his name.

When Welch made a survey of the world literature in 1885, he found only 37 gastric resections recorded, with 27 operative deaths and none of the ten surviving patients had lived for more than 18 months. He rather grimly concluded that "the operation is applicable only to the rarest case, offers only a faint glimmer of hope, is attended with a prohibitive mortality, and never cures permanently."

Welch listed six reasons why gastrectomy was not applicable to the average case: (1) The presence of distant metastases; (2) location of tumor unfavorable for removal; (3) too extensive a growth; (4) widespread adhesions; (5) extreme debility of patient; (6) necessity for a specially trained team.

Four years ago, Livingston and Pack[1] again reviewed the world literature. They were able to collect 14,000 cases of gastric resection from 1881 up to 1939. Approximately 3,000 of these operations were performed in the United States. Undoubtedly many other such operations were done in that time, but these other cases are not available for statistical study since they never made an appearance in print. The analysis of these authors will be presented later in this paper.

Only the literature of the United States since 1939 bearing on gastric carcinoma will be briefly reviewed, since the work of Livingston and Pack is comprehensive and needs no amplification. An additional series of 155 cases of gastric carcinoma diagnosed at Charity Hospital in the last two years will be reported .

TREATMENT OF GASTRIC CARCINOMA

It is a matter of general agreement at the present time that the treatment of gastric carcinoma is a surgical problem from the start.[2] Non-recognition of this fact has been partly responsible for the poor results of treatment of this condition in the past.[3]

Boyce[5] states that "one of the causes of the high mortality of gastric cancer is the success of the medical treatment of cancer which masquerades as ulcer. The basic problem, when once the patient presents himself to the physician, is how soon the physician turns him over to the surgeon, and how soon the surgeon operates." This reduces the question to the simplest terms as far as the trained medical profession is concerned, but the public must be educated to present themselves for examination. Oughterson[14] of New Haven estimates that only 58 per cent of persons with gastric carcinoma ever enter a hospital. This estimate includes only the United States.

The sad fact seems to be that by the time a positive diagnosis is possible, the lesion is already inoperable in the great majority of cases. This is borne out by the observation that the resectability rate never approaches 50 per cent, even in the best institutions in the country.[6] There are no symptoms pathognomonic of cancer of the stomach; the symptoms are suggestive, not conclusive.[7]

More and more surgeons and internists are making the plea that exploratory operation be performed before a positive diagnosis can be made. Gray,[8] of the Mayo Clinic, has layed down certain criteria

which justify such a procedure. In brief, if the patient presents himself with an ulcer history and picture, operate if: (1) the ulcer is of short duration and the patient over 50 years of age; (2) the ulcer is over an inch in diameter; (3) no free hydrochloric acid is found in the stomach; (4) the ulcer is on the greater curvature or prepyloric, area of the stomach; (5) any chronic ulcer on the lesser curvature. Ulcers not fulfilling any of the above conditions may be treated conservatively for a month, then operation should be performed if there is no improvement under the medical regimen. But it must never be forgotten that many malignant ulcers show clinical improvement with conservative medical therapy.

The problems of diagnosis are beyond the scope of this paper. The question is not simply one of performing an exploratory laporotomy in all cases of lesions of the stomach that are possibly malignant. Often, even when the surgeon sees the lesion right before him after entering the abdomen, he is unable to make a final differentiation between benign and malignant. As an example of this, J. R., a colored male, entered Charity Hospital in 1940 with an acute abdomen. He was immediately operated upon, and a ruptured peptic ulcer was repaired. Ten months later he died in the same institution at the age of 40 with generalized metastasis from a primary focus in the stomach. Such cases could be multiplied many times over, and I do not feel that the fault lies with the surgeon. Certainly a biopsy was contraindicated under such circumstances and it is often impossible for an experienced pathologist to distinguish benign from malignant on gross inspection.

Perhaps mistakes are made in the other direction quite as often. Thus, in another case, a palpable mass was felt in the abdomen, the patient was anemic, had lost much weight, and had symptoms of gastrointestinal obstruction. X-ray examination revealed a large constant filling defect at the pylorus. Gastric analysis showed no free hydrochloric acid in the stomach, and yet at autopsy no evidence of cancerous activity could be demonstrated in the lesion. Even the radiologists admit that patients with resectable lesions often have no x-ray evidence of any lesion. This is particularly true when the carcinoma is at the cardia or in the fundus.[11]

But these cases are the exception rather than the rule, and if any improvement is to be made in the prognosis for carcinoma of the stomach, it can only be brought about through operation on suspicion and better technic on the part of the surgeons.

TYPES OF OPERATIONS

In general, three types of surgical procedure are employed in gastric carcinoma. I shall not go into detail as to surgical technic. Suffice it to say that the patient may be explored; he may have some form of palliative procedure such as a gastroenterostomy; or an attempt may be made to extirpate the malignancy by subtotal or total gastrectomy. Often the final decision as to which type of procedure will be employed is not made until after the abdomen is entered.

As surgical technic and surgical care become perfected, more and more reports on total gastrectomy appear in the literature.[9] The idea of performing a total removal of the stomach is not new. In 1875 Czerny hinted at this possibility, which was put into practice in 1883 by the American surgeon, Connor. His patient died shortly after the procedure was ended. Fourteen years followed before Schlatter performed the first total gastrectomy with temporary cure. Up to 1942 there are about 240 total gastrectomies recorded in the literature, with an operative mortality of over 50 per cent. This is a formidable procedure, and even at the Mayo Clinic, reporting 27 cases, the operative mortality has been 60 per cent. This type of operation is indicated when the whole stomach is involved as in sarcoma or linitis plastica, and in cases where the malignant lesion is found in the fundus or near the cardia. Needless to say, the growth must be restricted to the

stomach, and the stomach must not be bound down with adhesions.

Resection is usually reserved for those cases in which metastasis is not demonstrable at operation or is confined to a few adjacent lymph nodes. Zollinger,[10] working at Peter Bent Brigham Hospital in Boston, says that "the presence of lymph node metastasis does not mean that the patient will not survive five years or longer." The presence of single or small metastatic lesions in the liver and the absence of metastasis elsewhere is not necessarily a contraindication to subtotal gastrectomy.[17] With the newer advances in surgery of the pancreas, as developed mainly by Whipple and his associates, the resectability rate will undoubtedly increase. The head of the pancreas and other structures in the loop of the duodenum are common sites for direct extension of carcinoma of the pancreas.

It seems doubtful if total resection will ever play more than a minor role in the gastric cancer problem. By the time that so much of the stomach is involved that it must all be removed, the prognosis is practically hopeless. Paradoxically, the patient on whom the least amount of surgical procedure has to be practiced is the one who is likely to live the longest. Only five five-year cures have been reported of patients in whom the whole stomach was removed. Undoubtedly part of this poor result is due to the fact that linitis plastica is the most malignant lesion involving the stomach, and linitis plastica is one of the prime indications for total gastrectomy.

RESULTS OF OPERATION

The dictum laid down by Welch in 1885, as to the need for trained surgeons to perform gastric operations if good results are to be expected, still holds true. This particularly applies to the immediate operative mortality. The general surgeon who operates on only five or six cases of carcinoma a year probably does more harm than good. In spite of this, the similarity of end results in all large series reported is quite remarkable.

The figures[12] usually run something like this: Of every 100 patients with gastric carcinoma entering hospitals in the United States today, 50 are inoperable. Twenty-five of the remainder have resectable cancer. Five of the 25 subjected to resection die an operative death. Of the 20 who survive operation, 14 are dead within three years, 16 are dead before five years, and we may then report five five-year cures from the original 100 patients. If the diagnosis were made early enough so that resection could be perfomred in every case, 20 of the original 100 would be alive in five years; twenty would also owe their deaths directly to the operation. The balance is almost perfect. Even if present operative mortality rates were cut in half, the total number of five-year survivals would only be increased by 2 per cent.

Perhaps the best figures in the country are those of the Mayo Clinic.[13] In 1941, 277 operations were performed for malignant lesions of the stomach; 105 of these operations were partial gastrectomies, with an operative mortality of 13.3 per cent. The other 172 operations were divided as follows: 29 palliative procedures with a 6.9 per cent mortality; 122 explorations with a 3.3 per cent mortality; eight total gastrectomies with a total 50.0 per cent mortality; and 13 not specified.

For several years at this institution exploratory laparotomy has been advised routinely in all cases of malignant lesions of the stomach regardless of the extent unless there is obvious metastasis or the general state of the patient prohibits. A larger percentage of all patients with gastric carcinoma have been subjected to operation in the past few years, but there has been little change in the proportion of resections carried out to the total number of patients operated upon.

Emmett[15] reports a series of 74 cases. Forty of these were inoperable when first seen. Thirty-four operations were performed. There were five explorations with a 40 per cent mortality; two died in the hospital and three died within a year. Five palliative procedures were tried, with a 20 per cent mortality; one died in hospital

and four died within a year. Twenty-four gastrectomies were performed, with a 20 per cent mortality; five died in hospital, five died within a year, five survived at least five years. Two of those who died in less than five years succumbed to other causes than carcinoma. Emmett's percentage of resections, nearly 70 per cent of the operable cases, is one of the highest recorded. He places the life expectancy of the unoperated cases in his series at only two or three months. Contrary to the general belief, he holds that anemia is a constant and early sign.

Zinninger[16] reports 16 cases of total gastrectomy from the Massachusetts General Hospital in 1938, with a 50 per cent operative mortality. At the Cincinnati General Hospital between 1932 and 1936, 42 per cent of all patients with a diagnosis of carcinoma of the stomach were subjected to operation. Only 9 per cent of these operations were resections. In the period 1937-1939, 50 per cent of the patients were operated on, and the percentage of resections had risen to 43. Zinninger[16] attributes the increase in resections to two main factors: (1) Earlier diagnosis and (2) better technic.

From South America, Amesti[18] reports a series of 107 patients operated on for gastric carcinoma. Forty-three of these received subtotal gastrectomies, and nine underwent total gastric resection. Four of these latter died as a result of the operation, and of the five survivors, only one lived for more than 13 months, at which time the report was made.

In performing 16 subtotal resections, Sanders[20] has a mortality of two cases, and two five-year survivals. One of the most rapidly fatal types of carcinoma affecting the stomach is linitis plastica. In eleven cases judged inoperable when first seen,[22] the longest period of survival after the first discernible symptom was 18 months. Fifteen patients with linitis plastica who underwent operation did not live more than three months after operation in any case, and only three of the 15 were thought to be resectable after the abdomen was opened.

Carcinoma involving the cardia and fundus is particularly difficult to diagnose preoperatively. Symptoms of obstruction are rarely present in this silent area, and a mass is seldom palpable. X-ray diagnosis is notoriously difficult when the lesion is high in the stomach. Such patients are usually candidates for total gastrectomy. Garlock[30] explored 25 patients who subsequently proved to have carcinoma in this area. Nine were resectable, and four of these died postoperatively. Four were still alive and without evidence of metastasis from seven to 18 months postoperatively at the time the report was made.

Between 1934 and 1939, 273 persons with gastric cancer were seen in Seattle.[25] Only 12 patients of this total were resected, and but six survived operation. In the succeeding years, this record has been improved. In 1940 there were 42 cases; 22 explored, 12 resected, with a mortality of 50 per cent. In 1941, of 67 cases; 30 per cent explored, 10 per cent resected, and 7.5 per cent of the total survived operation. In 1942, of 34 cases (records not complete for whole year) 10 per cent were explored and 8 per cent resected; all survived (three patients).

In 1942, Cole and Forsee[28] present 39 subtotal gastrectomies performed in the Army Medical Service, with only one operative death.

Saint[9] has collected 250 cases of total gastrectomy performed in this country. Of these, 88 were before 1933 and entailed an operative mortality of 50 per cent. Since then, three comparatively large series attest the growing frequency of this type of operation; Mayo Clinic, 27 cases with 60 per cent mortality; Lahey Clinic, 55 cases with 30 per cent mortality, and Massachusetts General Hospital, 80 cases with 40 per cent mortality.

Finally, briefly reviewing the conclusions of Pack and Livingston,[1] the average resectability of carcinoma of the stomach is 18.7 per cent, which is to be compared with Billroth's original estimate of one in 200 cases. The average mortality of gastric resection is 17.74 per cent, and the range from 5 to 52.6 per cent. The mortality was halved

during the last years of the study. One-third of the patients who survive operation are living at the end of three years, one-fourth at the end of five, and one-fifth at the end of ten years. Excision by the casual rather than by the specially trained surgeon almost doubles the mortality.

The incidence of resectable carcinoma in the United States is set at 10,000 per year, yet only 3,000 resections have been reported in this country. The American College of Surgeons has 1,279 five-year cures registered. Twenty per cent of patients dying of carcinoma of the stomach show no distant metastasis at autopsy. In 50 years, all definitive and long term cures have been obtained by gastrectomy.

This review of the recent American literature is in no sense complete, but it is fairly representative of the status of surgical procedures in the treatment of gastric carcinoma in the United States today. Most surgeons feel that death from metastasis is more merciful than death from the original gastric cancer. A rough tabulation of the series reported above follows:

Source	No. of cases	No. operated upon	No. resected	Mortality resection
Mayo		277	105	13.3%
Emmett	74	34	24	20%
Cincinnati		50%	20%	
South America		107	52	
Sanders			16	12.5%
Seattle	143	47	22	6 cases
Army			39	1 case

CHARITY HOSPITAL SERIES (33.5)

The patients at Charity Hospital form a large group mainly coming from the lowest economic classes. They usually do not present themselves for medical treatment until the last stages of disease. The resident staff is constantly changing, and of minor experience as far as major abdominal surgery is concerned. This represents the darkest side of the history of gastric cancer. The following series of figures is largely self-explanatory. From 1922 to 1931 inclusive, there were 758 patients treated at Charity Hospital for gastric cancer; 245 died in the hospital, 32.3 per cent; of 533 not operated upon, 70.3 per cent, 148 died in hospital, or 27.7 per cent. Of 275 patients operated on, 29.7 per cent, 97 died in hospital, or 43 per cent. Of the last 200 patients operated upon, 90 died in the hospital, 16 were discharged possibly cured; 86 per cent were males, 8.5 per cent below 40 years of age.

In every case, preoperative diagnosis was possible, due to the advanced stage of the disease. It is of interest to note that 25 per cent gave a typical ulcer history extending over several years, whereas a large majority of the rest, 125 cases, had symptoms of less than six months' duration. Maes feels that the determination between gastric ulcer and gastric cancer is impossible by any known means short of surgical exploration, and it is not always easy or possible then. Almost the only thing common to the majority of these patients was a marked loss of weight, a loss that is always more pronounced in gastric cancer than in any other disease which gives rise to gastric symptoms. Jaundice is a late and ominous sign. In only 85 of the patients operated upon was a mass palpable before operation. Maes bids us regard with suspicion: (1) An indigestion after middle life in a previously well person; (2) any acute digestive disturbance after middle age superimposed on chronic digestive disturbances not responding promptly to medical treatment; (3) vague general symptoms.

A more detailed analysis of 200 surgical cases: Gastrectomy, 35 patients, 51.4 per cent mortality; exploration, 56 patients, 30.4 per cent mortality; palliative procedure, 104 patients, 43.6 per cent mortality.

The only patients who can be considered to have a successful follow-up in the Charity Hospital records are those who died in the hospital.

From 1932 to 1940 inclusive, there were 1,163 patients treated at Charity Hospital for gastric cancer. Of these, 356 died in the hospital; of 829 not treated surgically, 218 died in hospital. Of 344 patients operated upon, 138 died in the hospital. Of

200 surgical cases with 82 deaths, 77 were palliative procedures with 35 deaths; 68 were explorations with 16 deaths; 55 were gastrectomies with 31 deaths (56 per cent).

Boyce concludes that the increased number of gastrectomies in comparison with the decreased number of gastroenterostomies from the first series is a reflection of the conviction that gastroenterostomy has a very limited field and often is little more than a hopeless procedure which enables the patient to live longer and suffer more; whereas gastrectomy, with only a slightly greater risk, offers a much greater prospect of temporary relief if not of permanent cure.

The status of but 20 patients, out of the total of 400 reported, is known. Thirteen died within four years, two of these deaths being due to incidental causes. Two are known to have hopeless metastasis at the present. Five were alive and without apparent recurrence when last seen eight months up to 11 years after operation.

From 1941 to 1942 inclusive, there were 155 patients treated at Charity Hospital for gastric cancer. Of these, 58 died in the hospital. Seventy-eight were not treated surgically and 37 died in the hospital. Out of 77 treated surgically, 21 died in the hospital. Although the mortality of those treated medically was considerably higher than those treated surgically, it would be wrong to infer that operative procedures were responsible for the difference. Most of the non-surgical cases were moribund on admission, while the surgical cases were in comparatively good health.

An analysis of 77 operations reveals the following: 25 explored, with three operative deaths; 27 palliative procedures with five operative deaths; 25 subtotal resections with four operative deaths.

Apparently surgical technic has improved considerably at Charity Hospital since the last analysis was made. In every type of operation the mortality rate has dropped significantly, yet a larger proportion of the total admissions is being treated surgically. We feel that this is a very hopeful sign. When the first series was reported by Maes, more than ten years ago, the mortality at Charity Hospital was the second highest in the country in the large number of series reported by Pack and Livingston. At the present time, the mortality figures compare favorably with those from any similar institution in the United States.

Follow-up reports on the 21 patients surviving gastric resection have in most cases been very inadequate. One died seven weeks postoperatively. Six more had evidences of metastases at intervals varying from three to 25 months following operation, with an average of thirteen months. Twelve had no evidence of metastasis when last seen, but this figure is of little significance, as the longest follow-up was six months. Most patients are lost sight of the day they are discharged from the hospital.

In the series covering the last two years, there were 105 males and 50 females; 67 were white and 88 were colored. All ages from 27 to 94 were represented, with 98 cases in the fifties and sixties. Twelve patients were under 40 years of age and of these 12, six were males and six females. It is hardly valid to draw conclusions from such a small series, but in general the younger the patient the more fulminating the cancer.

In only two cases was the diagnosis missed. One patient was thought to have a malignancy who later proved to have a benign ulcer at autopsy, and one patient was thought to have a perforated ulcer when the lesion was malignant. A mass was palpable in the epigastrium in nearly 50 per cent. Anemia and loss of weight were almost constant findings. Pain in the epigastrium was the most common chief complaint, but almost every conceivable symptom is recorded in the history sheets.

The following table compares the three series reported from Charity Hospital:

	No. of cases	No. operations	No. explored	No. gastroenterostomies	No. resected	Mortality per cent
1922-1931	758	275	56	104	35	51.4
1932-1941	1163	344	68	77	55	56
1941-1942	155	77	25	27	25	16
Total	2076	696	149	208	115	

SUMMARY

An outline of the history of the surgical treatment of gastric carcinoma from the time of Theodor Billroth up to the present is presented. Since 1880, the frequency of operation for this common condition has been steadily increasing. Operative technic has improved, and there is general agreement that operation is the treatment for carcinoma of the stomach. The average doctor must be on the lookout for the earliest signs of gastric malignancy. At Bellevue Hospital in New York, there have been three times as many admisisons for gastric carcinoma as for gastric ulcer.

A few representative series from different parts of the United States reported in the last two years have been included. The work up to that time has adequately been covered by Livingston and Pack. Fifty per cent of the patients seen in hospitals are inoperable. Only 25 per cent have resectable cancer, and only 5 per cent may expect to live five years after the diagnosis has been made. But 20 per cent of the patients who recover from resection will live five years or more after operation. The average operative mortality rate in the United States today following gastric resection is about 20 per cent.

Finally, a series of over 2,000 cases seen in the last 20 years at Charity Hospital is presented. While the resectability rate at this institution has more than doubled, the operative mortality has been cut to one-third of what it was ten years ago. This improvement must in part be attributable to better technic and better preparation of the patients in the last few years.

CONCLUSIONS

1. Gastric cancer is a common and highly fatal disease.

2. Improvement in its treatment will have come about through earlier operation rather than better surgical technic.

3. The treatment is surgical

4. Five per cent five-year cures may be expected today, considering the disease as a whole.

6. Twenty per cent five-year cures may be expected today considering the disease from a surgical point of view.

7. Of the estimated 10,000 resectable cases in the United States each year, only 3,000 cases have been resected in the past 60 years.

8. One thousand two hundred and seventy five-year cures following operation are on record.

9. The technic of gastric surgery at Charity Hospital has improved in the last ten years.

10. Gastric carcinoma cannot be cured by operation, but the life expectanacy of the patient may be considerably lengthened.

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THE PATHOLOGY OF ARTERIOSCLEROSIS

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It is a well known fact that there are persons with more or less worn-out cardiovascular systems who live to a ripe old age. The widespread belief that arteriosclerosis is merely a manifestation of old age is not compatible with the known facts. The mere aging of vessels results in distention and dilatation and consequently in increasing tortuosity. But mere aging never results in deformations of the vascular wall and the vascular tube which are typical of arteriosclerosis.[1] Therefore, arteriosclerosis is not merely a change or transformation attending the process of aging but rather is a disease of the vessels manifesting itself mainly during senescence.

In discussing a subject as broad and full of controversy as arteriosclerosis, it is obviously necessary sharply to delineate the boundaries of the subject. Consequently it is my purpose to confine myself to a definition of the general term "arteriosclerosis", its general incidence, and to a discussion of its vascular pathology.

NOMENCLATURE

Various names have been used to describe this condition in the course of medical history simply because at different times the general interest centered on different aspects of the disease. Thus it is quite easy to understand that, while one investigator regarded the hardening of the vascular wall as the most important factor, another attributed prime significance to the deposition of fatty substances in the intima of large vessels. The former described the condition as a sclerosis, while the latter spoke of it as an atheromatosis. Since the underlying processes vary in different vascular regions in accordance with functional differences, some investigators even thought that they were dealing with entirely different diseases, because in one case the most pronounced phenomenon consisted of fatty degeneration or atheromatosis of the intima and in another, of calcification of the media. In view of the fact that experimentally induced changes take place mainly in the large arteries of the body cavities, in vessels of the elastic type, these changes were supposed to constitute typical arteriosclerosis. This picture was described by the term atheromatosis. The other changes were observed principally in the media of the peripheral vessels and they were described as calcification of the media (Mönckeberg's sclerosis). The condition was entirely separated from atheromatosis and was regarded by Mönckeberg as an altogether different syndrome. Marchand insisted, however, that both processes belong together, or at any rate, that they generally occur together even though they may vary proportionately. For this reason he has suggested the very acceptable term atherosclerosis.[2] The terms arteriosclerosis and atherosclerosis are synonymous and the former has gained its universality through usage.

INCIDENCE

It has been noted that arteriosclerosis is a very common disease which increases in frequency and severity with advancing age. In a series of three thousand bodies Ophüls[3] found that there are only a few scattered

cases showing fairly well marked lesions during the first two decades. These were almost invariably associated with chronic nephritis. In the age group from 20-29, 3.5 per cent of the bodies examined showed moderate arteriosclerosis. The incidence of the disease rises rapidly from 9.25 per cent between 30 and 39, to 26 per cent between 40 and 49 years, to 48 per cent between 50 and 59, to 78 per cent between 60 and 69, and finally to 90 per cent in patients over 70 years of age. The clinical importance of the disease is clearly shown by some figures collected by Anitschkow in 1925. Among 618 deaths in patients over 50 years of age, death was due to arteriosclerosis in 132, to cancer in 177, and to infectious diseases in 118.

PATHOLOGY

Aorta: In studying the ordinary atheromatous changes in the aorta one finds a considerable variety of lesions which gradually merge into each other and therefore seem to represent various stages of development of the same process. If this is so, one is justified in assuming that the simplest lesions that one finds in those parts of the vessel which are relatively intact, represent the earliest stages of the process. They bear a considerable gross resemblance to the fatty spots which Lange[2] describes, although microscopic examination reveals that the histologic changes in them are more severe and perhaps slightly different in character.

These early lesions, which are present in every atheromatous aorta, consist of small round grayish or yellowish spots, measuring a few millimeters in diameter. They usually project slightly but distinctly on the inner surface of the blood vessel. They exhibit a marked tendency to fuse and form larger, rounded or irregular plaques which project more definitely into the lumen. In the course of time the surface of many of these plaques becomes milky white by the development of the fibrous tissue, while the fatty parts in the depth of the lesions break down and form the mushy material from which the condition has received its name (athere—Greek for mush). From this point on further change may take place in two directions; either the surface is permanently sealed by the deposition of a calcareous plate or the degenerative process in the depth gradually extends to the surface through the fibrous opening. When the softening eventually reaches the inner surface the atheromatous masses are partly washed away by the blood stream. In this manner there are established ragged ulcerative defects at the bottom of which there always remain considerable remnants of necrotic material.

Concerning the localization of the process one usually finds the most advanced lesions in the abdominal aorta whence they may extend into the iliac arteries. The thoracic aorta is usually less severely affected but it is frequently more or less markedly involved. In the descending part of the thoracic aorta the plaques are most marked on the posterior wall around or in the vicinity of the openings of the intercostal arteries. The base of the aorta is often relatively intact but in severe cases fully developed lesions may be present throughout the entire aorta and the proximal parts of its larger branches.

Microscopic examination of early patches reveals a moderate diffuse fibrous thickening of the intima which is most marked at the point of the gross lesion. Here the intima is sometimes more than twice its normal thickness. The thickened intima always contains many star-shaped cells which are filled with minute fat droplets. These consist of both connective tissue cells and spherical fat-carrying histiocytes which Leary[1] refers to as "fibrolipophages" and "globular lipophages," respectively. The fatty change frequently starts in the musculo-elastic layer but this is not always the case. Sometimes it is more marked in the superficial layers of the intima. The amount of lipoid material in the tissues varies and bears no direct relation to the amount of fibrous thickening. The intima may be considerably thickened and yet contain relatively little fat. The diseased tissue may contain a few lymphocytic cells. From the beginning a peculiar type of necrosis is seen

in the fibrous tissue. By it the fibrillated collagen is transformed into a finely granular material which tends to give the staining reaction for calcareous material with hematoxylin. This type of necrosis is not necessarily preceded by a fatty degeneration of the intimal cells. It is patchy in character and usually limited to the deeper layers but it may extend to the surface. In most of Ophül's[3] frozen sections there was also present a diffuse change in the muscular tissue of the media which consisted of straight hyaline streaks parallel to the course of the elastic membranes and the muscle cells. The vasa vasorum frequently show a slight perivascular round cell infiltration. The adventitia is little affected in any stage of the disease, except in aneurysmal formation when it becomes greatly thickened.

Winternitz, Thomas, and LeCompte,[5] in a highly provocative monograph, have brought forth strong evidence that the old and recent evidences of hemorrhage so commonly seen in the intima and the walls of sclerotic vessels are not artefacts but the result of rupture of the vasa vasorum. The vasa vasorum normally arise from three sources, the adventitia, the region of the orifices of the branches of the vessel, and directly from the lumen. These vasa vasorum increase with age and disease, and in arteriosclerotic vessels the pattern becomes very extensive. These intimal hemorrhages are of significance because they abound in just those regions which are the sites of predilection of arteriosclerotic lesions. They postulated three factors in relating these vessels to the arteriosclerotic process, namely, vascularity, hemorrhage, and sclerosis. When intra-mural hemorrhage occurs, the possibility of absorption of the mass of serum, fibrin, and cells diminishes greatly as the viability of the tissue in which they are deposited is reduced, especially when one considers that hemorrhage may continue and add fresh increments. Organization of the blood mass is also dependent upon the potentialities of the surrounding tissue, and if absorption or organization is not complete, the residuum remains as a necrotic focus. Winternitz and his associates have demonstrated the suspicious character of an "atheroma" deep in the vessel wall, which is not grey or indifferent in color, but which histologically shows masses of amorphous material containing disintegrated red blood cells, fibrin, and mononuclear cells filled with blood pigment. At the periphery of such an area, the open ends of vessels may be seen; these often contain fresh blood and suggest the source of hemorrhage. Through the study of many lesions of this sort, these men feel certain that while hemorrhage, and perhaps lesser exudations are not the only source of the materials that form atheroma, they are potent contributing factors.

In atheroma the fatty changes are first confined to the intima but later the muscle cells of inner layers of the media are also found filled with minute droplets of fat. There has been some discussion as to whether the fat is also primarily deposited in the ground substance of the interstitial tissue, possibly also in connection with degenerating elastic tissue. Ophüls[3] believes that the fat droplets do not appear outside of cells until the cells containing them have undergone necrosis and disintegration, when they become widely scattered in the interstitial tissue. Anitschkow[2] and Leary[1] are of the opinion that there is a deposition of isotropic fat in the swollen ground substance and that this deposition is soon followed by the appearance of the latter's "lipophages" and "fibrolipophages."

Ordinarily, the proliferation of fibrous tissue is most marked in the superficial layers of the intima. Here a considerable amount of dense hyaline fibrous tissue is developed which covers the degenerative processes in the depth of the lesion. The latter have a tendency to go on to necrosis. This development of fibrous tissue gives the athermatous plaques their milky white covering through which one can often see the yellow degenerated focus underneath. The new fibrous tissue itself may also become involved in the fatty change.

The necrosis at the base of the thickened intima eventually becomes quite extensive

and often involves the larger part of the plaque, including the superficial layers of the media. In exceptionally severe cases the degeneration and necrosis may extend far down into the media, leaving only a narrow zone of muscle and elastic tissue adjacent to the adventitia.

The necrotic material is finely granular and contains many irregularly scattered fat droplets of varying size and numerous cholesterol crystals. The latter are believed to be the result of a chemical splitting of the lipoid material into fatty acids and cholesterol. While the former are saponified and absorbed, the latter, being very sparingly soluble, drops out in crystalline form. The necrotic tissue also contains much calcerous material in the form of minute granules. It has been pointed out by Lange[2] that these degenerative changes are not characteristic of atheroma but occur likewise in any mass of degenerating connective tissue.

The fibrous covering of the atheromatous necrosis may be destroyed by a gradual extension of the necrosis and softening from the depth to the surface. As already mentioned, when the latter is reached the soft atheromatous material is washed away by the blood stream and an ulceration is established with ragged overhanging edges. The bottom of the ulcer is covered with remnants of necrotic material which may be distinctly glistening on account of the presence of cholesterol crystals. The ulcers are rarely deep enough to cause bulging or perforation of the aortic wall.

In other places the superficial fibrous tissue of the plaque undergoes necrosis en bloc and is calcified, forming a hard calcareous plate which permanently seals the atheromatous lesions. In the living connective tissue adjoining the area of calcification development of bone tissue may take place, consisting of bone spicules and fatty or cellular marrow.

EXPERIMENTAL ARTERIOSCLEROSIS

It is interesting to compare these human lesions with the experimental changes produced in the aorta and large arteries of rabbits by feeding them cholesterol or substances rich in cholesterol, such as egg yolk or brain tissue. These experimental lesions were discovered by Ignatowski[2, 13] in a series of rabbits that had been fed on milk and egg yolk. He attributed them to a protein content of the diet. Anitschkow and Cholatow,[2] however, recognized that they were due to the cholesterol content and reproduced them by feeding the animals pure cholesterol. The results of these early workers have since been confirmed by many other investigators.

In experimental animals the changes in the aorta have the same patchy distribution as the atheromatous lesions. In contrast to the latter they are usually more numerous and larger in the thoracic aorta than in the abdominal portion. They consist of slightly raised yellow spots and microscopic examination reveals that the intima is infiltrated with lipoid droplets which are found in connective tissue cells and in large mononuclear phagocytes. The normal intima of the rabbit's aorta is very thin and contains little connective tissue. The thickening of it is partly due to the development of new cellular fibrous tissue. As a result of this and of the infiltration with lipoids the intima may become as thick or thicker than the media. Ordinarily the microscopic appearance of the lesions resembles most closely that of the fatty streaks in man and there is an absence of the severe degenerative changes of the atheroma. Necrosis in the depth of the thickened intima followed by precipitation of cholesterol crystals and calcification has, however, been seen in old lesions by Bailey.[6, 14]

Although Anitschkow is perfectly aware of many of the differences between experimental cholesterol arteriosclerosis and human arteriosclerosis, nevertheless, he is convinced that the two are identical[2] and his views have attained wide acceptance.

There are, however, many reasons why experimental atherosclerosis differs from human arteriosclerosis. The lesions thus far have been exhibited only in herbivora. Carnivora are not amenable. The reason may be as Schoenheimer[2] has suggested, that herbivorous animals cannot excrete

cholesterol. Cholesterol atheromatosis is produced under physiologic conditions that are not even approached by man. It always requires a marked cholesterolemia to produce the characteristic changes in the rabbit, while in most cases there is no relation whatever between the degree of arteriosclerosis and the blood level of cholesterol in man.[7, 8] That a true clinical atheromatosis may occur in man is suggested by the rare cases described by Montgomery and Osterberg[9] of xanthoma tuberosum, associated with a high degree of cholesterolemia. Land and Sperry[10] compared the concentration of cholesterol in the blood serum and the degree of arteriosclerosis in 123 healthy persons who died suddenly from violence and no relationship was evident. Furthermore, in the experimental disease the lipoid deposits are ordinarily not limited to the aorta and larger blood vessels but are also found in the adrenal cortex, the liver, the spleen, and the kidneys. Such lesions have never been found in man. The renal arteries which are practically always affected in human arteriosclerosis are seldom involved in experimental arteriosclerosis, while the cerebral arteries are never involved. In addition, as Duff[11] points out, lipoid depositions within the media occur early in experimental arteriosclerosis and are late phenomena in the human variety. In summary, there is increasing doubt whether cholesterol arteriosclerosis represents human arteriosclerosis.

Many other experimental methods have been tried to produce human arteriosclerosis. Newburgh and Clarkson[12] produced arteriosclerosis by a high protein diet, but in a later publication they admit that the protein acted only indirectly by causing a hypercholesterolemia. Saltykow[2] injected staphylococci, but his positive results have never been confirmed. Bailey[14] injected diphtheria antitoxin, but obtained only medial calcification. Klotz[15] found arteriosclerosis in rabbits which were suspended by their hind legs over a prolonged period, thus causing an increased cephalad pressure, but his experiments have never been confirmed. The probability is strong that some of the investigators ignored the occurrence of spontaneous arteriosclerosis in some animals.

Pulmonary artery: Lesions very similar to those of the aorta are found more rarely in the pulmonary artery. It is generally recognized that this disturbance may be divided into two forms, namely a secondary form and a primary form. Generally speaking, it is a disease of early adult and middle age rather than that of advanced years. Primary arteriosclerosis of this artery is very uncommon as indicated by MacCallum,[16] whose case was the first he had seen in 12,000 autopsies. Hence, this lesion will not be described. The lesions of the secondary variety are usually much less severe in character, consisting of slightly raised yellow plaques of the usual structure. The amount of new fibrous tissue, as a rule, is limited and calcification and ulceration are unusual. A special study of the histological changes was made by Torhorst and Ophüls[3] quotes his description. According to him the intima normally consists of two layers: an elastic muscular and an elastic fibrous one. Even in apparently normal arteries he observed calcification and degenerative processes in the media. Independently of these alterations in the media, he found fatty spots in the intima in which the lipoid material was present in the ground substance and in connective tissue cells and large mononuclear phagocytes. In sclerosis there was a marked thickening of both layers of the intima, especially of the fibrous inner portion. He believed that the fatty degeneration follows the intimal thickening. The prominence of the spots is primarily due to the accumulation of fat, later to hyaline swelling and proliferation of the fibrous tissue. There were only slight degenerative changes in the media.

Atheromatous spots are also frequently present in the large muscular arteries. They are quite common in the coronary, cerebral and renal arteries; less so in the splenic, mesenteric arteries and in the branches of the celiac axis. Similar lesions in the arteries of the extremity do not as a rule contain as much lipoid material. In

all muscular arteries, except for the early stages, there is a much more marked involvement of the media. This is believed to be the reason why the diseased arteries are often diffusely or more irregularly dilated and stretched longitudinally, a condition that is especially common in the splenic artery. This stretching may go on to true aneurysmal dilatation, although it is generally known that the development of aneurysm on the basis of simple arteriosclerosis is not a common occurrence. While the larger arteries usually exhibit this tendency to dilatation, the smaller ones tend to become narrowed by the atheromatous plaques and completely occluded by secondary thrombosis.

CORONARY ARTERIES

Wolkoff[2] has made a careful study of the histologic structures of the coronary arteries at different ages. Wolkoff found that there is an early splitting of the internal elastic membrane. In the large branches the intima is relatively thick and, like that of the aorta, consists of a musculo-elastic, fibro-elastic and a fibrous layer. The development is already well advanced at 15 and finished by 30 years of age. The media contains much elastic tissue and there is no definite external elastic membrane. A large amount of elastic tissue is present in the adventitia. It is evident from her description that the large branches of the coronary arteries resemble partly the elastic and partly the muscular arteries.

According to Wolkoff, the early stages of arteriosclerosis in the large branches of the coronary arteries are very much like those of the aorta. Microscopic sections show an irregular fibrous thickening of the intima with marked lipoid infiltration. In course of time the development of fibrous tissue is very marked. At first the new tissue is very cellular and shows a considerable irregular infiltration with lymphocytes. The vasa vasorum and the adventitia also show marked perivascular round cell infiltration and the adventitia becomes somewhat more dense and fibrous. Areas of necrosis and softening make their appearance in the depth of the thickened intima. The intimal proliferation is often sufficient to close almost completely the lumen of the diseased vessel, a final complete closure resulting from thrombosis.

Calcification, which is frequent, occurs in the degenerated parts of the intima, not the media. The latter in the late stages is very thin, apparently as a result of compression. The dividing line between muscle and fibrous tissue may remain sharp and is indicated by remnants of the internal elastic membrane. In other places, however, the internal elastic membrane is destroyed and the muscle deeply invaded by the proliferating fibrous tissue. In some places this may lead to a complete destruction of the media. Grossly, the arteries become palpably stiff and may exhibit more or less widespread calcification, giving the impression of "corduroy" or "pipe-stem" arteries.[17] Examination of the interior discloses fibrous or fibrolipoid plaques of variable extent associated with variable degrees of narrowing of the lumen. In some instances, however, the arteries are obviously dilated. Tortuosity of the coronaries is a phenomenon which accompanies reduction in the size of the heart and may affect normal or sclerotic arteries. Sometimes, as in the temporal arteries, coronary sclerosis is associated with elongation and tortuosity even in hypertrophic hearts. The small intra-muscular branches very rarely show any arteriosclerotic changes.

CEREBRAL ARTERIOSCLEROSIS

The brain is one of the common locations of arteriosclerosis. Mott[18] places cerebral arteries fifth in order of occurrence of eleven commonly elected location. Thomas[18] places them fourth in a list of fifteen. Cerebral arteriosclerosis usually occurs alone, especially in vessels at the base, and in not over 10 per cent of cases is it accompanied by generalized vascular disease. Neuberger[2] classifies cerebral arteriosclerosis from a pathological point of view:

1. Sclerosis of the larger arteries, especially the vessels at the base and the larger branches in the cerebrum, cerebellum, brain stem, basal ganglia and choroid plexus. It is rare in vessels of the cortex. Histologically this type resembles sclerosis as found in the systemic septum.

2. Arteriosclerosis: This is the diffuse hyperplastic sclerosis of other authors. It affects only the arterioles and capillaries, and is chiefly found in the cortex, grey nuclei and medulla. The process is in most part intimal and the chief characteristic is hyaline degeneration of the vessel walls. The endothelium may swell with fine fat droplets, and the lumen is narrowed; the media and adventitia are affected later.

3. Calcification: In true arteriosclerosis calcification occurs as a late stage, following fatty degeneration, chiefly of the intima.

VISCERAL ARTERIOSCLEROSIS

The arteriosclerotic changes in the trunks of the renal arteries do not show marked peculiarities.[2] The smaller branches within the renal tissue, however, react very differently. In them the thickening of the intima is due to a large extent to the development of new elastic tissue. There is some development of new elastic tissue in all arteriosclerotic arteries, but in the branches of the renal arteries the thickened intima consists almost entirely of superimposed new elastic membranes which seem to be split off from the internal elastic membrane. Oppenheim[2] has investigated this new elastic tissue and believes that it is to a great extent a physiologic process caused by the larger amount of blood which passes through the kidney with advancing age. The condition is pathologic, he believes, when there is added degeneration of the elastic tissue, proliferation of the fibrous connective tissue and a certain, although usually limited, amount of fatty degeneration.

From his own observations, Ophüls[3] thinks it more accurate to describe separately the lesions which occur in the interlobular arteries, intralobular arteries and the arterioles. In the larger branches the development of new elastic tissue is the most prominent feature. He believes that this is to some extent physiologic but when there are as many as four to eight superimposed layers, he becomes skeptical and states that the process is not normal. In chronic hypertension the intima is much thicker and there is much more elastic tissue than in non-hypertension of the same age. The thickened intima seldom shows degenerative changes. Intimal thickness and medial fibrosis decrease from the larger to the smaller arteries. The primary change in the arterioles is in a form of hyaline and the muscular coat. This hyaline material stains quite diffusely with Sudan III but Ophüls believes it doubtful whether this necessarily indicates the presence of a lipoid material. The hyaline material later may be replaced by concentric layers of fibrous tissue and sometimes there is a definite increase in the elastic tissue. The latter is particularly noticeable in cases of advanced general arteriosclerosis without serious renal involvement.

Staemmler[2] has studied the splenic artery at different ages. The main splenic artery frequently shows a severe sclerosis. It is very commonly dilated and unevenly distended, showing numerous small saccular aneurysms, which rarely burst. The structure of the main artery has not been studied extensively, but it is known that medial calcification and intimal arteriosclerosis are frequent. The changes in the splenic artery and its larger branches correspond to those found in other muscular arteries of corresponding size; however, the smaller branches show a hyaline degeneration that seems to be largely dependent of arteriosclerosis elsewhere.

Typical diffuse arteriosclerotic changes like those seen in the small renal arteries are frequently observed in the pancreas. They may be associated with a hyaline degeneration of the arterioles, which may extend to the blood vessels of the islands of Langerhans and cause a progressive destruction of those bodies.

Schmiedt[2] reviewed the changes found in different age groups from birth to over 90 years of age of superior mesenteric arteries. He states that no sharp line can be drawn between the physiologic changes with age and pathologic sclerosis. The lesions which he describes consist in early progressive splitting of the internal elastic membrane followed by fibrous thickening of the intima with development of elastic fibers and hyaline changes and a fibrosis of the media

sometimes accompanied by calsification. Fatty deposits were rarely seen. The changes begin in the trunk and spread in the periphery. Kummel's studies indicated that the inferior mesenteric artery was involved even to a lesser extent.

The gastric arteries[19] in case of ulcer in relatively old individuals often show an endarteritis. In the chronic cases in elderly individuals the changes are very much like those of ordinary arteriosclerosis.

ARTERIES IN THE EXTREMITIES

The physiologic changes in the arteries of the extremities, as represented by radial artery, were studied by Hallenberger,[2] who found that between 20 and 30 years of age there is already a reduplication of the internal elastic membrane. In the course of time 3 or 4 layers may be found in this manner. The development of fibrous tissue in later years he regards as pathologic, while Thayer and Fabyan[20] are of the opinion that this is still physiologic. Their tables show a progressive diffuse thickening of the intima from birth to old age with onset of connective tissue development especially notable in the fifth decade. The presence of regressive changes such as necrosis, calcification and atheroma is, of course, evidence of a pathologic process. On the whole they found little evidence of fatty change.

In senile gangrene the arteries of the lower extremities show advanced degrees of arteriosclerosis with progressive obliteration of the lumen. Microscopically, sections reveal that the intima is greatly thickened by the development of fibrous and to a lesser extent of elastic tissue. This thickening is usually irregular and as a result the narrow remaining lumen is situated excentrically. In the depth of the thickened intima there are areas of fatty degeneration and necrosis with deposit of cholesterol crystals. The degeneration and necrosis often extend deeply into the media where the muscle is gradually crowded out by the new fibrous tissue development. The adventitia may participate in the fibrosis. The arteries are often calcified by the development of circular solid deposits of calcareous material at the more or less obliterated dividing line between the intima and media. This causes a pipe-stem appearance of the arterial wall. The final complete closure is usually due to thrombosis.

Similar changes occur in the arteries of the lower extremities somewhat prematurely in the case of diabetes mellitus, although in certain cases of diabetic gangrene the large arteries are free from disease and the obstruction is in the small arteries of the foot which on microscopic examination show a marked obliterative endarteritis.

Joslin[21,22] made a careful study of the relation of diabetes to arteriosclerosis. He found it in the coronaries in 19 per cent and in the legs in 13 per cent of his fatal cases. Arteriosclerosis increases with the duration of diabetes from 30 per cent in patients who have suffered from diabetes for five years to 68 per cent in patients who have had the disease for 30 years or more. Sclerosis of the retinal arteries appears relatively early and is usually frequent. He attributes the great prevalence of arterial disease in diabetes to the hyperlipemia.

MÖNCKEBERG'S SCLEROSIS

In the arteries of the extremities a different type of arteriosclerosis is often found and attention was first called to it by Mönckeberg in 1903.[2] It consists in a primary necrosis and calcification of the media which is not necessarily associated with intimal lesions. This type of calcification is entirely different from the ordinary form observed in atheroma in its location and in its microscopic appearance. The calcification is deposited in ring form, affording a trachea-like appearance and sensation. The deposits may be plate-like or continuous over long stretches of the arteries. Mönckeberg found that this form of sclerosis is more common in the lower extremities than in the upper. In 55 cases,[13] he found the femoral artery affected in 51, the tibial in 36, the radial in 21, and the popliteal in 15. In 500 individuals between 30 and 80 years of age, Lange found the femoral involved in 97 per cent, the posterior tibial in 87 per cent, the ulnar in 14 per

cent, the popliteal in 9 per cent, and the bronchial in 2 per cent.

It is still doubtful whether Mönckeberg's sclerosis is a different form of arteriosclerosis or whether they have a different etiology.[13, 15] The latter is suggested by the fact that lesions of thes character may be experimentally produced in rabbits by a method entirely different from that which produces atheroma in these animals. While the latter is due to lipoid infiltration, medial necrosis followed by calcification was first observed in these animals by Josue[2] in 1903 after intravenous injection of adrenalin. He was doubtful whether they were of toxic origin or were the result of the rise in blood pressure produced by the injections of adrenalin. These findings have been confirmed by all later investigators except by Braun, who claims to have produced marked intimal lesions by long continued injection of very small doses of adrenalin. The toxic nature of the changes were demonstrated by Braun[2] who obtained the same results by the simultaneous injection of adrenalin and amyl nitrite which prevents the usual rise of blood pressure, as was shown by controlled experiments. Similar lesions were produced by injections of digitalis, irradiated ergosterol, viosterol and diphtheria toxin. These experimental results would seem to indicate that the lesions are of toxic origin. Moschowitz[13] and Klotz[15] also believe that these lesions are separate and distinct entities and are not to be considered as arteriosclerotic in origin. The two types of lesions, however, occur simultaneously so frequently in the same individual and in such topographic relation that Ophüls[3] found it difficult to doubt that they are part of the same process.

An elaborate anatomical and clinical study of "hyperplastic sclerosis" has been made by Geoffrey Evans.[23] According to Evans the characteristic lesions of this condition are found in the arterioles and the small arteries. In the early stages the vessels show endothelial proliferation which in the arterioles is followed by an accumulation of hyaline material. The process may go on to complete closure of the lumen. The small arteries from which the arterioles spring also at first exhibit signs of endothelial proliferation which is followed by the development of fibrous and elastic tissue. In both the arterioles and the smaller arteries the process is a diffuse one. The changes in them may occur independently of each other. An hypertrophy of the muscular wall is sometimes associated with the intimal lesions.

The distribution of these lesions in the various organs is at best capricious. They are most commonly found in the kidney, somewhat less frequently in the spleen. Evans found them in six out of 21 cases in the pancreas. They are comparatively rare in the brain and here usually restricted to relatively few arteries. The same is true of the liver, lungs and adrenals. He did not see them in the myocardium, stomach or intestines. He found diffuse hyperplastic sclerosis in all cases with marked hypertrophy of the heart, but it was also present in several cases without cardiac hypertrophy.

SUMMARY

Arteriosclerosis is a disease of the vessels and manifests itself mainly during senescence. Atheromatosis is a term that designates the intimal lesions of the large elastic vessels primarily and "Mönckeberg's sclerosis" is the term applied to the medial lesions of the muscular arteries. The terms atherosclerosis and arteriosclerosis are synonymous and are applied to the total process. Hyperplastic sclerosis cannot as yet be placed in the arteriosclerotic process. The syndrome is common and increases in frequency and severity with age. The earliest lesions of the atheromatous process are disputed but it is generally believed that they are identical or similar to the fatty streaks that are somtimes reversible. The pathology is that of lipoid infiltration of the intima followed by fibrosis, necrosis and either the ragged atheromatous ulcer or the calcareous plaque results. The most comman site is the abdominal aorta. Other common sites are the pulmonary, coronary, cerebral, and renal arteries. Experimental atheromatosis closely resembling the lesions

in man has been produced in the rabbit by feeding cholesterol. Some of the aspects of these experiments have been discussed and it is concluded that its relationship to human arteriosclerosis is still not clear. "Mönckeberg's sclerosis" is a primary necrosis and calcification of the media of muscular arteries which is not necessarily associated with intimal lesions. The lower extremities are most commonly affected. It has been produced with epinephrine, viosterol, and diphtheria toxin. Hyperplastic sclerosis is seen in arterioles and smaller arteries. It is a diffuse endothelial proliferation that is followed by hyaline infiltration.

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ATYPICAL PNEUMONIA COMPLICATING SEVERE VARICELLA IN AN ADULT

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T. J. GRABLE, M. D.†
AND
J. H. MUSSER, M. D.†
NEW ORLEANS

It has not been generally appreciated that varicella may occasionally assume the form of a rather severe disease, although this was recently emphasized by Waring, Newbuerger, and Geever.[1] This seems to be true especially for adults. It is our impression that the common contagious diseases generally assume a more severe form when they occur in adults. Pneumonia occurring as a complication of varicella is not recognized as a common complication of this disease. Bullowa and Wishik,[2] in 1935, listed pneumonia as a complication in 0.8 per cent after an analysis of 2,534 cases in which complications occurred in 5.2 per cent. Pneumonia thus accounts for only about one-seventh of all the complications of chickenpox. The etiologic agent is listed by these authors as being almost always a streptococcus and most frequently *Streptococcus hemolyticus.*

We believe our case worthy of reporting because it represents an uncommon complication of varicella and because we believe the etiologic agent to be an unusual one.

CASE REPORT

Varicella; atypical pneumonia responding to sulfathiazole; complete recovery.

T. G., a 27-year-old physician at Charity Hospital, presented himself for treatment on March 30, 1943. Approximately two and one-half weeks pre-

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viously, March 13, 1943, he had examined a child who developed typical chickenpox the following day. Notes in this child's chart indicate that the disease ran the usual mild course. On March 29, the patient experienced malaise, low back pain, mild sore throat with moderate dysphagia, and a temperature of 100 F. There was no cough or chest pain. On March 30, he noticed several superficial vesicles about his feet and several pink macules and papules on his abdomen. He believed he was developing chickenpox, especially in view of his recent exposure and because he had never had varicella during his childhood.

Upon physical examination it was found that his temperature was 101 , pulse 112 per minute, respirations 24 per minute, and blood pressure 116/68. The patient was well developed and well nourished and did not appear acutely ill. A few faint pink macules were seen upon the neck, trunk, and arms, and there were about a dozen vesicles widely scattered over the neck, trunk, and flexor surfaces of both arms. There was one vesicle on the arch of the right foot which seemed to be deep seated and had a "shotty" feel.

Mild conjunctivitis and mild coryza were present. The pharynx was moderately injected and seemed to be dry. There was a slight grayish exudate over the whole posterior pharyngeal wall. There was no cervical or other lymph node enlargement. Examination of the chest, lungs, and heart revealed no abnormalities. Abdominal examination was entirely normal. The diagnosis at that time was probable varicella.

LABORATORY REPORTS

Blood Counts:

April 2—Hemoglobin 15.8 gm. per 100 c. c.; white blood cells 6,150; polymorphonuclear cells 69 per cent; lymphocytes 25 per cent; monocytes 3 per cent; eosinophiles 2 per cent; basophiles 1 per cent.

April 5—Red blood cells 5,480,000; hemoglobin 16.0 gm.; white blood cells 6,200; polymorphonuclears 77 per cent; lymphocytes 23 per cent.

Urine:

March 30—Albumin negative; sugar negative; microscopic negative.

April 4—Albumin slight trace; sugar negative; microscopic negative.

April 6—Albumin negative; sugar negative; microscopic negative.

Serology: April 2—Kline and Kolmer negative.

Sulfathiazole Blood Level: April 5—1.7 mgm. per 100 c. c.

Blood Culture: April 3—negative.

Sputum: April 3—negative for pneumococci.

Throat Culture: April 6—Negative for diphtheria; no increase in streptococci.

X-ray of Chest:

March 30—No evidence of pulmonary lesions; cardiac shadow normal (fig. 1).

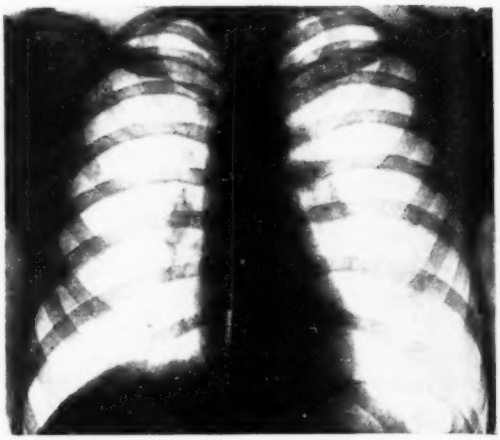


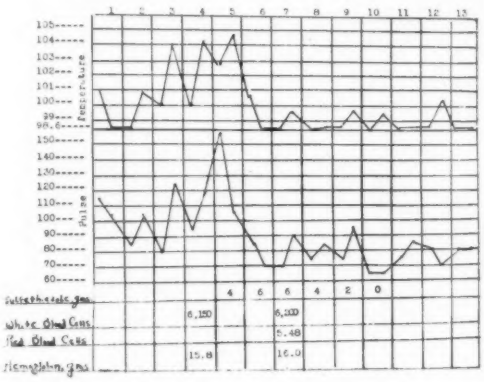
Fig. 1.

April 3—Portable film: Bronchopneumonic infiltration throughout both lung fields (fig. 2).

April 5—Marked clearing of the infiltration in both lung fields (fig. 3).

CLINICAL COURSE

The patient's temperature record is presented in chart 1. Two days after admission (April 1), the patient's rash became quite extensive and typical of varicella. Macules, papules, and vesicles were to be found in any one small area. There were only a few pustules to be found at this time. The



pustular stage never became very marked. Pruritis was severe and was relieved only temporarily by calamine lotion. Several vesicles were found upon the soft palate and posterior pharynx.

On April 3, the lesions appeared somewhat hemorrhagic. Dysphagia persisted and was unrelieved by warm saline and one-half strength hydrogen peroxide gargles. At 7:00 p. m. on this day the patient had a paroxysm in which he suddenly became cyanotic, unable to respire, and covered with perspiration. The patient stated he felt that

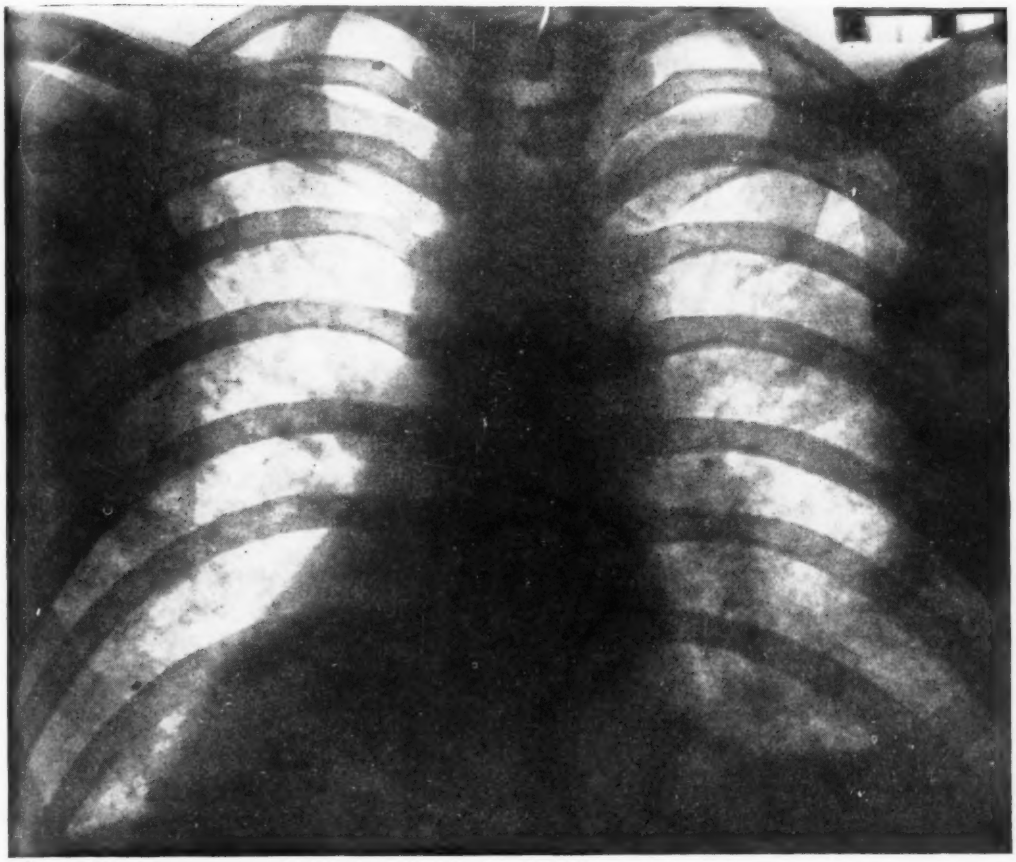


Fig. 2.

he would surely suffocate. The paroxysm lasted for only a few minutes and was interpreted as being a laryngeal spasm.

The following day the lesions were quite hemorrhagic and the patient experienced two paroxysms similar to the one already described. One of the paroxysms was immediately relieved by the subcutaneous injection of 0.3 c. c. of adrenalin chloride. Examination of the lungs on this day revealed a moderate number of crepitant rales at the right lung base posteriorly, with only slightly increased breath sounds and voice sounds in that area. The percussion note was unchanged. Respirations were only slightly increased in rate and shallow in depth. There was no cough or expectoration, but moderate pleuritic type pain on deep respiration. Roentgen examination of the chest revealed an extensive bilateral bronchopneumonic infiltration. Sulfathiazole therapy was started in the usual full dosage recommended for adults with pneumonia. From this time until discharge on April 12, improvement was rapid and continuous. Sulfathiazole therapy was discontinued on April 7,

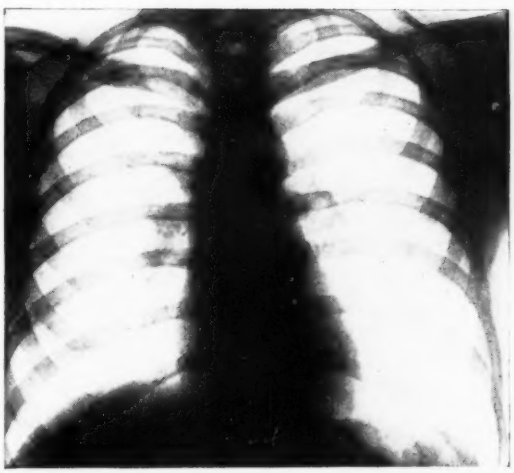


Fig. 3.

at which time only an occasional crepitant rale could be heard at the right lung base. There were no further paroxysms of laryngeal spasm, but mild pleuritic pain continued until 10 days after discharge. At the time of discharge, all of the crusts had dropped off, or had been picked off.

COMMENT

We have considered the possibility that this case may have been one of variola. However, the rash as described seems to us to have been typical of varicella.

We have reviewed the cases of chickenpox admitted to Charity Hospital from 1933 to 1943 for evidences of pneumonia. Our case is the only one which presented sufficient evidence for a diagnosis of pneumonia. This would appear to indicate the rarity of pneumonitis as a complication of chickenpox. However, routine roentgenograms of the chest are not taken at Charity Hospital on cases of varicella. In view of the sparsity of physical findings as compared to the extensive pulmonary involvement as seen on the chest roentgenogram, it does not seem unlikely that more frequent involvement of the lungs would be discovered by greater use of roentgenographic examination. The report of Ramsay and Scadding[3] concerning "benign circumscribed pneumonitis" revealed the high incidence of clinically unsuspected pulmonary lesions which occur roentgenographically even in cases of simple upper respiratory infections.

Reimann, Havens ,and Price[4] recently described the clinical manifestations of "virus" pneumonia as "characterized by a gradual onset with dry inflammation of parts or all of the mucosa of the respiratory tract; chills or chilliness; slowly rising fever lasting one to three weeks and falling by lysis; delayed signs of migratory pneumonia, often bilateral; relative bradycardia; unproductive cough; headache; photophobia; sweating, and a normal leukocyte count. Therapy with sulfonamide compounds has no influence on the course of the disease; complications are rare, and the mortality rate is practically nil." Our experience with the "virus" pneumonias conforms to the above description. We believe that the pneumonia in this case most probably had a virus as the etiologic agent, although by the methods at our disposal, we are unable to prove such a contention. The particular type of virus responsible probably was the virus of varicella. However, there is one aspect which most surely does not conform to the suggested cause of this patient's pneumonia and that is the apparent rapid response to sulfathiazole. Although the remainder of the patient's clinical picture strongly suggests a virus as the etiologic agent of his pneumonia, it is our belief that the apparent response to a sulfonamide is weighty evidence against such an etiologic agent. Stimson[5] has said "no sulfonamide compound has yet been found which has any effect on infections caused by a filterable virus." The other etiologic agent which suggests itself from the work of Bullowa and Wishik[2] is the streptococcus. They found that pneumonia complicating varicella was nearly always due to the streptococcus and usually to *Streptococcus hemolyticus*. If our patient's pneumonia was due to *Streptococcus hemolyticus*, we should expect just such a response as was obtained to sulfathiazole therapy, but the other findings do not very strongly suggest such an etiologic agent, since there was no cough or expectoration, no leukocytosis, and a minimum of physical findings despite the widespread bilateral roentgenologic pulmonary involvement.

SUMMARY

(1) We have presented a case of severe varicella in an adult which was complicated by pneumonia and laryngeal spasm.

(2) The two most likely etiologic agents for the patient's pneumonia are discussed. In lieu of adequate proof for a specific agent we can only conclude that the pneumonia was "atypical."

(3) The apparent laryngeal spasms are believed to have been due to pox lesions occurring upon the mucous membrane of the larynx.

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CLINICO-PATHOLOGIC CONFERENCE*

AN INTERESTING CASE

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A. R., white male, aged 55, was admitted to Charity Hospital on June 14, 1943 and died on August 1, 1943.

Summary of History: Six months before admission a firm, non-tender mass appeared in the submental region, which slowly enlarged. Two months later he noticed a similar mass in the right submaxillary and left axillary regions. The submental mass was biopsied and he was given x-ray therapy, which was followed by temporary decrease in size of the masses. When they increased in size later, he was admitted to Charity Hospital. During the interval since onset, he had lost 20 pounds and had developed vague epigastric pain.

Summary of Physical Examination: Temperature 100°; blood pressure 100/65. The patient was a well developed, well nourished, white male, who did not appear acutely ill. Several firm, non-tender, movable masses were palpated in the anterior cervical region. In the submental region was a small midline scar, well healed, beneath which was a firm mass partially fixed to the surrounding tissues. A soft apical systolic murmur was heard. Small nodes were palpated in the inguinal region. In the left axillary region was a mass 3 x 3 cm., resembling the cervical tumors.

Summary of Laboratory Findings on Admissions .Urine: specific gravity 1016; albumin 0; sugar 0; 2 to 4 white blood cells per high power field. Blood: hemoglobin 71 per cent; red blood cells 3,120,000; white blood cells 7,850; platelets 160,000; hematocrit 32:5; mean corpuscular volume 104; polys 70; eosinophils 2; basophils 1; monocytes 3; lymphocytes 24. Kline and Kolmer negative.

Summary of Courses in Hospital: X-ray of the chest revealed some slight enlargement of both hila, and small rounded areas of parenchymal infiltration suggestive of metastasis. He had a temperature elevation from 101° to 103°, going higher as a terminal event. He was given repeated 500 c.c. whole blood transfusions. He was given a course of sulfathiazole, then of sulfadiazine, without benefit. He received a total of 600 R filtered to each of two mid-abdominal parts. In spite of treatment he became more anemic, and developed dysphagia and dyspnea. Death occurred on August 1, 1943.

Dr. Gillentine: The essential findings in this case are enlarged, non-tender, slightly radiosensative submental glands, tributary swelling of the submaxillary and cervical glands and a progressive macrocytic, hyperchromic anemia with a low platelet count and normal white count, vague epigastric pain, x-ray evidence of enlarged hila and small round areas of pulmonary infiltration, fever of 101-103° F. unaffected by sulfa drugs, net loss of twenty pounds, and death seven and one-half months after the first lymphatic enlargement.

While lymphatic enlargements were limited to the sub-mental groups and their tributaries, syphilis, carcinoma of the lower lip or tongue, plague, german measles, tularemia, infectious mononucleosis and other infections might have been considered. Time, a negative Wassermann, and the absence of local lesions disposed of these. Glandular tuberculosis need not be seriously considered in view of the chest films you see before you, and because of the rapidly

*Conference held at Charity Hospital on August 12, 1943.

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††From the Department of Pathology, Tulane University School of Medicine.

progressive anemia and lack of necrosis in the lymphomas. The duration of the illness, the generalized lymphadenopathy and chest findings and the progressive anemia and normal white count limit our consideration to aleukemic leukemia, Hodgkin's disease and lymphosarcoma.

Aleukemic leukemia pathologically seems to be identical with leukemic leukemia. The majority of such cases reaching the stage of generalized enlargement of the lymphatic glands, replacement or infiltration of the bone marrow, anemia and fever of 101-103° F. will also show a leukemic blood count. The normal white count late in the disease is against this diagnosis.

Hodgkin's disease might cause the painless progressive lymphadenopathy, the dysphagia and epigastric symptoms by pressure from enlarged glands, the anemia and progressive cachexia and remittent fever. However, it occurs infrequently past 30 years of age, in 60 per cent of cases distends the spleen, the anemia is usually secondary, and in early cases is not accompanied by a decreased platelet count. Isolated nodules in the lung parenchyma suggests metastasis and/or invasion of a type rarely seen in Hodgin's disease.

Lymphosarcoma is my diagnostic choice. The condition rarely spreads from a single node as suggested by the history, but it does spread regionally from lymph glands by invasion and infiltration as may be inferred from the chest plate and gastrointestinal symptoms. Discrete nodules in distant organs, for example the lungs, occur. One may consider with interest an explanation of the anemia. It is hyperchromic and macrocytic, if you will recall, and neither the picture of the intense stimulation of myelophthisis with anisocytosis, nucleated red cells and myelocytes or blasts, nor that of an aplastic anemia with lymphocytosis, even though the platelet count is low. One may postulate that infiltration and invasion of the stomach mucosa and duodenum has interrupted Castle's mechanism, in a similar fashion to carcinoma of the stomach, with the resulting pernicoid change. Such invasive processes may infiltrate the submucosa of the intestine and/or invade the wall. Dysfunction results from ulceration or stiffness of the area. The later progression of the anemia may have taken the myelophthisic or aplastic route. The absence of an enlarged spleen is in favor of this diagnosis, although fever is not common except late in the disease.

Question: Was fever present? *Answer*: Yes.

Dr. Pearson: Fever is an interesting phenomenon in these cases. It occurs fairly frequently. This has been pointed out by Baldridge in a large series of cases. We have been impressed here with fever especially in rapidly developing reticulum cell sarcoma. I recall one patient who was admitted with fever and cervical nodes which developed rapidly over a period of four weeks. At postmortem, marked abdominal dissemination in lymph nodes was present.

The main pathologic lesions, aside from peripheral lymph node involvement in this case, are those confined to the lungs, bronchial nodes, stomach, and perigastric lymph nodes. The spleen and the liver are of normal size and no nodules can be seen grossly. In the lungs there are several rounded white homogenous, flesh-like nodules present. The bronchial lymph nodes are enlarged and show the same appearance on cut section as those in the lungs. There is no evidence of any growth within the bronchi. The intervening lung tissue is well aereated and shows no sign of infection or abscess which is so common an accompaniment of bronchogenic carcinoma.

It is obvious in a case like this presenting lymphatic tumors and metastasis, and involvement of the stomach, that one is confronted with the task of differentiating grossly between Hodgkin's, lymphosarcoma, and leukemia. Especially with the lymphatic involvement of this magnitude and gross characteristic, one has to exclude particularly lymphatic leukemia, which in the face of the peripheral blood picture resolves itself to the aleukemic variety.

In Hodgkin's disease the lymph nodes are more or less matted together. In the spleen

and liver we would see not the rounded circumscribed involvement but a nodule whitish in appearance, the periphery of which fades somewhat imperceptibly into the surrounding tissue. This has been referred to as a "porphyry" spleen and liver and is a fairly characteristic of Hodgkin's involvement. The involvement of the stomach in Hodgkin's may be somewhat similar to the appearance presented in this case. As a rule they are not usually as distinct and rounded. For the same general reasons the pulmonary involvement is not that of Hodgkin's disease.

In lymphatic leukemia the spleen is large, sometimes extending to the brim of the pelvis. Cut section would show a salmon color due to the infiltration with cells of the lymphoid series. The liver would also be large and reveal infiltrations giving it a greyish cast. The lymph nodes would be similar in appearance, but metastatic lesions in the lung would not be present as this does not occur in lymphatic leukemia.

Gastrointestinal lesions, however, do occur in lymphatic leukemia, especially the aleukemic variety. Because of the fact that lymphatic leukemia is a less agressive lesion than lymphosarcoma, the involvement seen is confined exclusively to the mucosa and submucosa so that the mucous membrane is thrown into huge folds reminiscent of the "convolutions of the brain." This was first brought out by Briquet and published in Cruveilhier's Anatomy in 1838. From 1938 to 1942 we studied twenty-eight cases of leukemia that came to necropsy from Charity Hospital and found among those, twenty instances of lymphatic leukemia. Of those, two had this particular type of gastrointestinal involvement.

Interestingly enough, involvement of the gastro-intestinal tract is frequent in lymphosarcoma occurring in about one-third of the cases. It is either present as nodular involvement similar to the case presented or as diffuse thickening of the wall. It becomes apparent that there probably is no fundamental difference between lymphosarcoma and lymphatic leukemia. This has been brought out rather clearly by Furth's recent experiments in mice. Our distinctions are then anatomic and rather arbitrary depending in part upon the degree of aggression and true metastasis exhibited in cases and infiltrative characteristics of lymphatic leukemia. As long as we are ignorant of the etiology, I think it still serves a useful purpose to differentiate the conditions on anatomic grounds.

Microscopically we see here a tumor composed of lymphoblasts and lymphocytes. The picture is singularly monotonous. In the stomach we see infiltrations of all the coats and destruction of the muscularis. In the lungs the same type of cells are present.

Question: Was the bone marrow examined?

Dr. Pearson: No sternal marrow was described in this case. This is an important point as the picture is quite characteristic.

Dr. Gillentine: The classification of the malignant lymphomas is of slight clinical interest because of the uniformly grave prognosis of the entire groups. Academically such clinico- pathological subdivisions may form the basis for the determination of a cause or mechanism. Such knowledge of etiology might make specific therapy possible.

NEW ORLEANS
Medical and Surgical Journal

Established 1844

Published by the Louisiana State Medical Society under the jurisdiction of the following named Journal Committee:

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SEASON'S GREETINGS

The New Orleans Medical and Surgical Journal wishes to extend to its readers best wishes for a Christmas Season which, due to the circumstances of war, cannot be that happy period which was enjoyed before 1941. We hope, when our country has killed off the wild boars of Europe and the yellow pigs of Asia, that we will be able to return to a state of peace, happiness and security. It is the earnest hope of the Journal that this time next year there will have been returned to us our sons and our daughters; our medical friends will no longer be in uniform but will have come back to their families, and again will be practicing their profession. Perhaps it is too much to hope that the war will be over before next Christmas but at least we can have the ardent wish that this may be true.

THE SCIENCE OF HEALTH

Under this nomenclature Meredith discusses the health of people in general. He points out that about 10 per cent of the population may be considered as being sick; one-half of these seriously ill. Ten per cent of the population may be classified as "well" while the large intermediate group at the best can only be considered as being "semi-well."

Stated somewhat differently, Ryerson would classify this intermediate group of 90 per cent as follows: 30 per cent of these individuals have loss of health; 30 per cent have poor health; 20 per cent have average health. In other words, approximately only 30 per cent of the people in the country may be said to enjoy average to excellent health. These figures are confirmed in part by the examination of the draftees of this country, approximately 50 per cent of the first two million registrants who were examined, according to the earlier figures released, were found unqualified for general military service. However, 10 per cent of these were disqualified for lack of educational qualifications. The experiences in the Canadian Army reflect those of the United States. Only fifty-six per cent of the Canadian recruits were found suitable for any type of military warfare. Twenty per cent of them were totally unfit and the remaining 25 per cent were considered to have sufficient physical stamina to serve in Canada or behind the lines.

The large number of men who physically and psychically are deemed unable to cope with the exigencies of military life should make American people pause and think. Physicians should be stimulated to greater efforts in the field of personal preventive medicine in order to build up and strengthen the large group of people who are consid-

ered as "semi-well" and who have poor health, to a bodily state in which they should be able to lead a healthy and happy existence. It should put our profession on the alert. These figures dealing with the health of a large segment of the population indicate, and should make the physician realize, that in the field of preventive as well as curative medicine there are large areas which have as yet been untouched.

DRAFT REJECTION

There exists at the present time a considerable difference of opinion regarding the men accepted for the draft, between those working on the draft boards and the doctors who are in active service. The latter point out that men are being sent to combat forces who are not physically qualified to carry on the duties of a soldier, that many of these men are so grossly and obviously unfit that it is impossible to imagine that they were accepted without more than a most cursory superficial examination. On the other hand, the civilian doctors and the doctors who are working in induction centers feel that many of the questionable patients who they finally pass could carry on as excellent soldier material. Take the question of a man who has a heart murmur which the cardiologist at the induction center after a complete cardiologic survey of the individual including an electrocardiogram and x-ray of the chest decides that this murmur is purely functional and that the inductee does not have an organic heart disease. This man appears at camp, the first time he responds to a sick call the murmur is picked up and he is hospitalized. There he may stay for a period of time and again return to duty. This may be repeated, because as soon as the heart murmur is heard, irrespective of the time and occurrence of that murmur in the heart cycle or where it is best heard, it is deemed to be organic and the same series of events are repeated. Ultimately the man will have little training and in all possibility may become a cardiac neurotic so that he is not fit for military service.

The draft boards are criticized because they send men to the induction center who have all kinds and types of physical disabilities but here again many of these diabilities are largely matters of opinion. A man who is able to do hard manual labor in civilian life despite some physical abnormality is certainly going to be able to the same thing in Army life. These men in all probability would make good soldiers and would give satisfactory service but because they have an abnormal condition they are returned to civil life.

It is to be regretted that there is not a closer liason between the induction centers and the men who made the physical examination at these centers with the Army physicians who may bring a man up before a disability board for discharge from the service. It is an oft repeated statement that we are scraping the bottom of the barrel now for our manpower. The induction center physicians are certainly making every effort to send into the Army men whom they deem qualified for the physical efforts that a soldier's life requires. Company commanders want only the superlative and the very best men physically in their organization. They can often bully their battalion surgeon, if a man is not 100 per cent perfect, into getting the poor soldier out of their unit into a hospital where he ultimately may be discharged and returned to civil life. It is estimated that more than 900,000 soldiers will be sent out of the Army on a surgeon's disability certificate and yet undoubtedly the great majority of these men will have to make a living for themselves not by mental effort but by physical strain. They have done it in the past and they will have to do it in the future. They should be continued in the Army possibly on a limited status duty, certainly doing the type of work they would do in everyday life or as closely approximating it as possible. It is only by cooperation between the various groups that have the say as to a man's physical ability that we will have sufficient manpower to win the war.

ORGANIZATION SECTION

The Executive Committee dedicates this page to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

OBSTETRIC AND PEDIATRIC SERVICE FOR WIVES AND CHILDREN OF ENLISTED MEN

In our November issue we called your attention to the fact that the Executive Committee was very busy with a plan for the care of maternity cases and children of enlisted men. A former plan had been proposed by the Children's Bureau of the Federal Government which was not satisfactory to the House of Delegates and to the Executive Committee.

On October 1 the Executive Committee met in special session in New Orleans to consider the recommendations of the special committee concerning this problem. The Executive Committee voted to accept the plan as submitted in principle under protest, and they asked the special committee to prepare appropriate objections to the plan which would be attached to the revised plan as a part of the agreement. The Executive Committee was able to get $50.00 for obstetrical care including prenatal and postnatal and delivery, $50.00 for obstetrical surgical consultants, increase to $20.00 for minor surgery performed, and the understanding that this program would only be participated in by physicians qualified by our Louisiana State Board of Mecical Examiners to practice obstetrics. So the plan was agreed upon as a war measure and only for the duration.

Following this article you will find a copy of the report of the special committee. The final plans of operation for the execution of the plan are now waiting final approval of the Children's Bureau in Washington. We have every reason to believe that this will be acceptable to the Federal Government. While it can be understood from the above explanation that the plan for this service was not acceptable to the Executive Committee for various reason's, it was the best that could be secured without provoking criticism in the failure of organized medicine of Louisiana to render such service to the boys in uniform. Very shortly you will be properly informed by the state board of health, parish societies, etc., exactly the agreements that have been determined for the administration of this service. It is presumed that all the doctors of the state will cooperate in rendering this needed medical service to the wives and children of the members of the armed forces.

November 6, 1943.

Executive Committee,
Louisiana State Medical Society,
1430 Tulane Avenue,
New Orleans, La.

Dear Sirs:

It appears, according to recent interpretation, that the resolution adopted at the last meeting of the Executive Committee with reference to the plan offered by the Louisiana State Department of Health pertaining to the Obstetric and Pediatric care of the wives and infants of men in the service, makes it mandatory for this Committee to accept this plan. This special Committee very reluctantly carries out this mandate, and accepts the plan under protest.

This plan herewith attached has been reviewed and amended, making such changes as:

(a) approving for participation in the plan only those physicians who are graduates of a medical school approved by the Council on Medical Education of the American Medical Association, and are licensed to practice medicine by the Louisiana State Board of Medical Examiners;

(b) increasing the obstetric fee. the consulting obstetrical surgical fee, and the pediatric fees.

The Committee looks upon the plan as being very dangerous with reference to the

future of medicine, and protests its acceptance for the following reasons:

1. Even though it is claimed to be an emergency measure for the present war emergency and six months thereafter, it is another entering wedge of great magnitude, to the socialization of medicine.

2. Agreeing with the expressions of the Michigan State Medical Society we believe "the opposition is based on the belief that this will encourage the development of a poor quality of obstetric and pediatric care, establish a precedent for further extension of governmental interest into the private practice of medicine, commit to such governmental activities those members of the medical profession who are in the military service, and who have not had an opportunity to express their opinions, and open the door to governmental medical service for all, without economic distinction or determination of need, and establish a fee schedule."

3. The physicians who participate in this plan will be obliged to accept certain fixed fees. The establishment of a mandatory fee table under primary control of a non-medical bureau is a menace to the quality of present and future medical service.

4. The House of Delegates of the American Medical Association (1943) did not approve the plan, and their action remains unchanged up to date. Both the House of Delegates of the American Medical Association, and the first report of this special committee to the Executive Committee, recommends an alternate plan, namely, making an allotment to the woman involved, thus permitting her to make her own arrangements with the physician of her choice. Despite the fact these soldiers' wives are given allotments for various other purposes, the government has turned this plan down with reference to the obstetric and pediatric care of the same women.

5. The Committee is informed by the American Medical Association that "insofar as our efforts can reveal, there has never been any legislative act passed by the Congress authorizing the initiation of the plan."

6. The physicians in Washington who are employed by the Department of Labor and the Children's Bureau to initiate and operate the plan are apparently committed to the socialization of medicine. At least one of their representatives, interviewed in this state, gives every indication that he favors such regimentation of the medical profession. When questioned with reference to his belief in the socialization of medicine he evaded the issue by stating "he did not know what was meant by socialization of medicine." Such an answer clearly indicates his belief, and what he will do when the emergency is supposed to terminate.

For these, and many other reasons, the Committee accepts the plan, as hereto attached under protest in compliance with the mandate from the Executive Committee of the Louisiana State Medical Society.

Very truly yours,

John T. O'Ferrall, M. D.,
Chairman, Special Committee

APPROVED:
Dr. C. C. deGravelles, President,
Louisiana State Medical Society.

P. S.—This report to be permanently attached to the plan.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

December 1. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Mercy Hospital Staff, 8 p. m.

December 2. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Executive Committee, Baptist Hospital, 8 p. m.

December 6. Board of Directors, Orleans Parish Medical Society, 8 p. m.

December 7. Eye, Ear, Nose and Throat Staff, 8 p. m.

December 8. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.

Touro Infirmary Staff, 8 p. m.
Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.

December 13. Scientific Meeting, Orleans Parish Medical Society, 8 p. m.

December 15. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Charity Hospital Surgical Staff, 8 p. m.

December 16. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Chaillé Memorial Oration, Hutchinson Memorial Auditorium, 8 p. m.

December 17. I. C. R. R. Hospital Staff, 12:30 p. m.

December 20. Hotel Dieu Staff, 8 p. m.
Clinico-pathologic Conference, Baptist Hospital, 8 p. m.

December 21. Charity Hospital Medical Staff, 8 p. m.

December 22. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.
French Hospital Staff, 8 p. m.

December 23. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

December 28. Baptist Hospital Staff, 8 p. m.

December 29. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

December 30. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.

During the month of November the Society held one regular scientific meeting. The program was as follows:

Penicillin—By Dr. Morris Schaefer, Ph. D., Department Pathology and Bacteriology, Tulane University. Drs. Howard Mahorner and Wm. Gillentine opened the discussion to this paper.

Rabies in New Orleans—By Drs. Emil E. Palik and Emma S. Moss. Drs. George McCoy and John M. Whitney opened the discussion to this paper.

NEWS ITEMS

Dr. B. I. Burns attended the annual meeting of the Association of American Medical Colleges held in Cleveland, October 25-27. Dr. Burns also represented the Louisiana State University at the Centennial Celebration of Western Reserve University in Cleveland, October 28.

Dr. T. J. Dimitry addressed the Forth Worth Eye, Ear, Nose and Throat Society on the recent advances in ophthalmology at a meeting of the Society, October 15. Dr. Dimitry also addressed the Thirteenth Annual Fall Clinical Conference of the Oklahoma Clinical Society in Oklahoma City, October 21.

Dr. H. W. Kostmayer and Dr. John H. Musser attended the meeting of the Association of American Medical Colleges in Cleveland, October 25-27. Drs. Kostmayer and Musser also attended the Centennial Celebration of Western Reserve University in Cleveland, October 28.

Dr. Clarence Steele presented a paper on Tinnitus Aurium, and Dr. Findley presented a paper on Syncope at the October meeting of the Ochsner Clinic Staff.

Drs. George Burch, Alton Ochsner and Ralph Platou recently attended a meeting of the Southwest division of the Alabama State Medical Society in Camden. Dr. Burch spoke on the treatment of congestive heart failure; Dr. Ochsner spoke on the surgical significance of amebiasis, and Dr. Platou spoke on hemolytic disease of the newborn.

Dr. Rena Crawford spoke on the importance of immunization of children at a meeting of the New Orleans Business and Professional Women's Club in New Orleans, October 13.

Dr. Edgar Hull was recently elected president of the general visiting staff of Charity hospital. Dr. W. D. Beachman was elected secretary-treasurer. The following physicians were elected to the medical advisory committee: Drs. Gilbert C. Anderson, Frank Chetta, Adolph Jacobs and C. Gordon Johnson.

Dr. Neal Owens recently attended a meeting of the American Society of Plastic and Reconstructive Surgery in New York. Dr. Owens also attended a meeting of the Association of Military Surgeons of the United States in Philadelphia, October 21.

Dr. W. A. Sodeman and Dr. Ralph Herren recently attended a meeting of the American Public Health Association in New York.

Dr. Carl Wilensky attended a meeting of the Academy of Ophthalmology and Otolaryngology in Chicago, October 10-13. While in Chicago Dr. Wilensky visited several of the eye clinics.

Dr. Maud Loeber addressed members of the Diocesan Council of Catholic Women at their annual convention held October 24 at Madonna Manor. Dr. Loeber is honorary president of the D. C. C. W. and a member of the board of the National Council of Catholic Women.

At the October staff meeting of the Mercy hospital Dr. Chris Bellone spoke on Utero-Sacral Ligament Shortening and Prolapse.

Comdr. W. Roger Brewster was recently appointed chief of the surgery department of the Naval Hospital in Brooklyn.

Lt. Col. Chester Fresh has been made a surgeon at Mitchell Field.

Lt. Col. C. E. Gorman was in New Orleans recently for a conference with officials of the induction stations and selective service officials on physical standards of the army.

Lt. Charles R. Hume's new address is Acorn 21, Navy Fleet Post Office, San Francisco, Calif.

Capt. Maurice Lescale was in town recently; he was in attendance at the scientific meeting of the Society.

Capt. V. P. Blandino writes—Received your letter of June 3, asking for the enclosed information. See, your letter made quite a trip trying to find me. I have been in North Africa since May 11, 1943. Our hospital was set up about three months ago, and we are kept quite busy and have many casualties. We have handled about 2,500 cases without a fatality. The work is interesting, but this is a God forsaken and lonely place. Recently the Tulane and L. S. U. units arrived here, and I believe will soon be in operation. Keep the home fires burning, and regards to you all.

The following physicians were recently promoted: Wilfred Finkelstein from first lieutenant to captain; Abe Golden from first lieutenant to captain; Isaac W. Kaplan from first lieutenant to captain; Harry Meyer from captain to major; Joseph Stamm from captain to major; J. Arthur White, Jr., from first lieutenant to captain; Richard L. Buck from first lieutenant to captain; and Carl N. Wahl from captain to major.

Comdr. David R. Womack's new address is, USN Amphibious Training Base, Fort Pierce, Fla.

Dr. Elizabeth Bass recently addressed the New Orleans branch of the American Association of University Women at a luncheon meeting.

Drs. Alton Ochsner, Francis E. LeJeune and Manuel Garcia attended the first Mexican congress on cancer at Guadalajara, Mexico, October 24-30. Dr. Ochsner spoke on bronchiogenic carcinoma; Dr. LeJeune spoke on carcinoma of the larynx; and Dr. Garcia spoke on carcinoma of the cervix.

Dr. Isidore Cohn was recently elected president of the Louisiana State University Alumni Federation.

Dr. Henry W. E. Walther recently attended a meeting of the International Medical Assembly of the Inter-State Post Graduate Medical Association of North America in Chicago. While in Chicago Dr. Walther visited the Urological Clinic of Dr. Charles Huggins in Billings Hospital and the Urological Clinic of Dr. Harry Culver at Cook County Hospital.

Dr. Waldemar R. Metz recently attended a meeting of the American Society of Plastic and Reconstructive Surgery in New York, and also visited various plastic surgery clinics in the East.

Daniel J. Murphy, M. D., Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

JACKSON-LINCOLN-UNION PARISH MEDICAL SOCIETY NEWS

At a meeting of the Jackson-Lincoln-Union Parish Medical Society held in Ruston, November 16, 1943, the following officers were elected to serve for 1944 as follows: President: Dr. T. A. Dekle, Jonesboro; Vice-President from Lincoln Parish: Dr. J. M. Johnson, Ruston; Vice-President from Union Parish: Dr. J. F. Tanner, Bernice; Secretary-Treasurer: Dr. J. J. Bennett, Ruston; Delegates: Dr. J. B. Harris, Ruston; Alternate: Dr T. A. Dekle.

AMERICAN MEDICAL ASSOCIATION COUNCIL OF MEDICAL SERVICE AND PUBLIC RELATIONS

The Council has authorized the publication of the following statement.

A STATEMENT OF GENERAL POLICIES

Pursuant to carrying out the duties imposed on it by the House of Delegates, the Council has adopted the following general policies:

1. The Council on Medical Service and Public Relations recognizes the desirability of widespread distribution of the benefits of medical science; it encourages evolution in the methods of administering medical care, subject to the basic principles necessary to the maintenance of scientific standards and the quality of the service rendered.

It is not in the public interest that the removal of economic barriers to medical science should be utilized as a subterfuge to overturn the whole order of medical practice. Removal of economic barriers should be an object in itself.

It is in the public interest that the standards of medical education be constantly raised, that medical research be constantly increased and that graduate and postgraduate medical education be energetically developed. Curative medicine, preventive medicine, public health medicine, research medicine, and medical education, all are indispensable factors in promoting the health, comfort and happiness of the nation.

2. The Council through its executive committee and secretary shall analyze proposed legislation affecting medical service. Its officers are instructed to provide advice to the various state medical organizations as well as to the legislative committees concerning the effects of the proposed legislation. It shall likewise be the duty of its officers to offer constructive suggestions to bureaus and legislative committees on the subject of medical service.

3. The Council approves the principles of voluntary hospital insurance programs but disapproves the inclusion of medical services in those contracts for the reasons adopted by the House of Delegates at the 1943 meeting.

4. The Council approves voluntary prepayment medical service under the control of state and county medical societies in accordance with the principles adopted by the House of Delegates in 1938. The medical profession has always been very much opposed to compulsory health insurance because (1) it does not reach the unemployed class, (2) it results in a bureaucratic control of medicine, and interposes a third party between the physician and the patient, (3) it results in mass medicine which is neither art nor science, (4) it is inordinately expensive, and (5) regulations, red tape and interference render good medical care impossible. Propaganda to the contrary notwithstanding, organized medicine in general, and the American Medical Association in particular have never opposed group medicine, prepayment or non-prepayment, as such. The American Medical Association and the medical profession as a whole have opposed any scheme which on the face of it renders good medical care impossible. That group medicine has not been opposed as such is evidenced by the fact that there are many groups operating in the United States which have the approval of the medical profession, and members of these groups are and have been officials in the national and state medical organizations. That group medicine is the Utopia for the whole population, however, is not probable. It may be and possibly is the answer for certain communities and certain industrial groups if the medical groups are so organized and operated as to deliver good medical care.

5. The Council believes that many emergency measures now in force should cease following the end of hostilities.

6. The Council believes that the medical profession should attempt to establish the most cordial relationship possible with allied professions.

7. There is no official affiliation between the American Medical Association and the National Physicians Committee. However, since it is the purpose of the National Physicians Committee to enlighten the public concerning contributions which American medicine has made and is making in behalf of the individual and the nation as a whole, it is the opinion of the Council that the medical profession may well support the activities of the National Physicians Committee and other organizations of like aims.

8. American medicine and this Council owe a responsibility to our colleagues who are making personal sacrifices to answer the call of the armed forces. Therefore, the Council expresses the desire to cooperate with the medical committee on post-war planning in order to assist our colleagues in reestablishing themselves in the practice of medicine, and in the preservation of the American system of medicine.

REFRESHER COURSE IN OBSTETRICS

The following letter has been sent to the doctors of Louisiana. This refresher course should be of great value to members of the medical profession of the state who are interested in the practice of obstetrics.

Plans have been made to continue to offer to physicians of the State an intensive refresher course in obstetrics at the Louisiana State University Medical Center. The course will extend over a period of two weeks and will be offered twice during the fiscal year, 1943-44, as follows:

December 13, through December 24, 1943,
May 1, through May 13, 1944.

The courses are being financed from Social Security funds allocated to the State by the Children's Bureau, U. S. Department of Labor. These funds are administered by the Section of Maternal and Child Health Service of the Louisiana State Department of Health.

Each physician, while in attendance at the course, will be allowed a per diem of $4.00.

Applications will be reviewed by a committee from the State Medical Society who will assist the Department of Health in selecting the physicians to be awarded the courses. A small group of physicians will be accepted for each course so that each physician may receive individual attention.

If you are interested in taking the course please return the enclosed application not later than November 20, 1943. Please list the dates in order of preference and convenience to you.

David E. Brown, M. D.,
State Health Officer.

THE LOUISIANA CHAPTER OF THE NATIONAL GASTROENTEROLOGICAL ASSOCIATION

The Louisiana Chapter of the National Gastroenterological Association held its annual meeting October 28 at supper, at Arnaud's Restaurant, and the following officers were elected for the coming year.

President: Dr. Percy L. Querens; Vice-President: Dr. Jules M. Davidson; Secretary-Treasurer: Dr. Gordon McHardy; Members of the Board: Drs. Donovan Browne, Herbert Weinberger, and Geo. T. Fasting.

STARS AND BARS CHAPTER OF ALPHA OMEGA ALPHA

The Stars and Bars chapter of the honorary medical society, Alpha Omega Alpha, announced the election of the following Senior students at Tulane University Medical School: Maridel Saunders, Nathan C. Lafleur, Jerome B. Katz, Jacob Faust, Madison J. Lee, George T. Schneider, Leonard K. Knapp, John Laurens, Charles J. Burnham, Robert B. Ellis, Rafael Nieto-Gomez, Longstreet C. Hamilton and Hugh Lee Boyd.

The formal exercises with the presentation of the key will be held the middle of December. At this time an address will be given by Dr. J. H. Musser and will be followed by a short business meeting. A banquet will be held following the business meeting, to which all members of the Tulane Medical School are invited to subscribe.

SOUTHERN BAPTIST HOSPITAL

New Orleans

The regular clinical staff meeting was held on November 23, 1943, at 8 p. m. The program included a case report on rabies by Dr. Roy de la Houssaye. Dr. W. H. Gillentine presented the report of the "Death Committee."

THE SOUTHERN MEDICAL ASSOCIATION

The annual meeting of the Southern Medical Association was held in Cincinnati October 16-18. There was a large attendance, over 2000 registrants being at the meeting. On the program from Louisiana were the following physicians, with the titles of their presentations: Drs. George E. Burch and Travis Winsor—The Phlebomanometer; Dr. John S. LaDue—Studies on the Mechanism of Compensation of the Failing Heart with Special Reference to Lanatoside C.; Drs. Charles B. Odom and Michale C. Kolczun (Lorain, Ohio)—Use of Procaine in Almond Oil in Various Pains; Dr. W. A. Sodeman and R. L. Pullen—Bagasse Disease of the Lungs; Drs. H. T. Engelhardt and V. J. Derbes—Allergy to Liver Extract; Dr. Edgar Burns—An Evaluation of Urinary Antiseptics; Drs. W. A. Sodeman and E. L. King—Heart Disease in Pregnancy: Prognostic Aspects; Dr. Wiley R. Buffington—Diseases of the Macula: Familial, Degenerative and Traumatic; Dr. Lucien A. Le Doux—The Management of the Menopause from the Gynecological Point of View; Dr. Harry Senekjie—Leptospirosis in New Orleans.

SOUTHERN SURGICAL ASSOCIATION

The annual meeting of the Southern Surgical Association will be held at the Roosevelt Hotel, New Orleans, December 7-9. An excellent program of some forty presentations has been prepared by the president, Dr. Barney Brooks of Nashville, and the secretary, Dr. Alton Ochsner of New Orleans. Louisiana men who will appear on the program include: Dr. Edgar Burns, who will speak on Diverticula of the Urinary Bladder; Dr. Guy A. Caldwell, whose subject will be Diagnosis and Treatment of Spondylolithesis; Major Dr. Michael DeBakey—Current Trends in Military Surgery; Dr. Isidore Cohn—Carcinoma of the Duodenum; Dr. Joseph A. Danna—Some Inter-

esting Experiences with Ether Anesthesia; Lt. Col. Mims Gage—The Simplicity of the Matas Endo-Aneurysmorrhaphy; Dr. Howard Mahorner—Control of Pain in Posttraumatic and Other Vascular Disturbances, and Dr. Rudolph Matas—Personal Experiences in the Surgical Treatment of Aneurysms of the Lower Extremities; Lantern Slide Exhibit with Special Reference to the Methods of Intrasaccular Suture (Endo-Aneurysmorrhaphy).

Other distinguished speakers will include Dr. F. A. Coller of Ann Arbor, Michigan; Dr. Gordon Heyd, of New York City, past-president of the American Medical Association; Dr. Frank Lahey of Boston, likewise a past-president of the Association; Dr. Paul B. Magnuson of Chicago; Dr. John J. Morton of Rochester, N. Y., and Colonel Bradley L. Coley of New York City.

LOUISIANA STATE UNIVERSITY MEDICAL SCHOOL

The Louisiana State University Society of Medical Sciences conducted a round-table discussion on Medical Ethics Monday night, November 15, 1943, at the Louisiana State University Medical Center before a large audience of members of the Society and guests. The purpose of the discussion was to portray a picture of the practical problems in ethical relationships encountered by the practitioner. In order to make a picture as complete as possible the participants in the discussion, Dr. Edgar Hull, Dr. Isidore Cohn, and Dr. E. L. Zander, Faculty members, represented respectively the specialties of medicine, surgery, and obstetrics-gynecology. Herbert Derman, Senior medical student, who is President of the Society, acted as moderator.

Some of the pertinent points of discussion concerned such important questions as fee-splitting, professional secrecy, abortion, the position of the Catholic doctor on contraception, the extent and abuses of professional courtesy, obligations of the physician, advertising, euthanasia, and establishment of fees.

At the business session, ballots were cast with Dr. Hull, the Faculty Adviser, for the election of the Outstanding Fellow of the Society who will receive the Hull Award at the annual banquet, November 29, 1943.

Dr. B. I. Burns, Dean of the Louisiana State University School of Medicine, announces the annual ceremony of Presentation of Keys to the newly elected members of The Circle, honorary scholastic society of the medical school. The ceremony took place in the auditorium of Charity Hospital at New Orleans, at 4:00 p. m., on November 9, 1943.

Dr. Richard Ashman, Director of the Department of Physiology, presented the keys to the following new members: Miss Evelyn Katz, Alfredo Perez, Ellis Mischle, Sydney Lewis, and John Signorelli of the Senior Class, and James Decuers, Miss Ann Sostanza, and Elliott Roy of the Junior class. Present Senior Class members of The Circle who received the award last year as Junior students include Leon Pordy, Joseph Edelman, and Shea Halle.

Dr. Edgar Hull, Director of the Department of Medicine, introduced the guest speaker, Dr. Chester A. Stewart, Director of the Department of Pediatrics and newly chosen honorary member for the year. Dr. Stewart's address, entitled Medicine Marches On, proved to be a most informative discussion of modern trends in medicine.

Key presentations were followed in the evening by a banquet in honor of Dr. James D. Rives, Clinical Professor of Surgery and retiring Chairman of the Faculty Advisory Committee of the Society. Leon Pordy, President of The Circle, presided at the dinner. Following an introduction by Dr. Urban Maes, Director of the Department of Surgery, Dr. Rives delivered the speech of the evening, the high note of an exceedingly interesting session.

Dr. B. I. Burns, Dean of the Louisiana State University School of Medicine, announced that Dr. John S. LaDue, Instructor in Medicine in the Department of Medicine, presented an exhibit at the meeting of the Southern Medical Association in Cincinnati, November 16-19. The subject of his exhibit is Studies on the Mechanism of Compensation of the Failing Heart with Special Reference to Lanatoside C. Other members of the Faculty who attended the Southern Medical Association meeting are Dr. Robert Lowe, Assistant Professor of Medicine, Dr. George Taquino, Director of the Department of Otolaryngology, and Dr. Spencer McNair, Clinical Assistant Professor of Otolaryngology.

Meeting in Cincinnati at the same time as the Southern Medical Association was the American Academy of Pediatrics, November 15-18, and the American College of Chest Physicians, November 16-18, both of which meetings were attended by Dr. Charles A. Stewart, Director of the Department of Pediatrics. At the American College of Chest Physicians, Dr. Stewart read a paper on Tuberculosis in Children and Young Adults.

Dr. Marion Hood, Assistant Professor of Parasitology, went to Cincinnati to attend the annual meeting of the American Society of Tropical Medicine.

DIRECTORY OF MEDICAL SPECIALISTS

Announcement is made that the Directory of Medical Specialists is now to be published by the A. N. Marquis Company of Chicago, publishers of "Who's Who in America." Previous editions

have been published for the Advisory Board for Medical Specialties by the Columbia University Press of New York City.

It is planned not to issue the next edition before 1945, on account of the war, but the A. N. Marquis Company will publish a supplemental list of all those who have been certified by the American Boards since the last (1942) edition of the Directory, totaling about 3600. This is to be distributed at cost, and monthly or bimonthly bulletins listing successful candidates for certification at examinations during the additional interim before the next edition, are to be issued as a subscribers' service.

Dr. Paul Titus (Pittsburgh) of the American Board of Obstetrics and Gynecology will continue as the Directing Editor, and Dr. J. Stewart Rodman (Philadelphia) of the American Board of Surgery continues as Associate Editor. The Editorial Board will be composed, as before, of the Secretaries of the fifteen American Boards.

Communications should be addressed to the Directing Editor, Directory of Medical Specialists, 919 No. Michigan Avenue, Chicago (11), Illinois.

THE SIXTH ANNUAL FORUM ON ALLERGY

The sixth annual forum on allergy will be held in the Statler Hotel, St. Louis, Missouri, on Saturday and Sunday, January 22-23, 1944. This is a meeting to which all reputable physicians are most welcome, and where they are offered an opportunity to bring themselves up to date in this rapidly advancing branch of medicine by two days of intensive post-graduate instruction. For instance, the fifteen study groups, any three of which are open to him, are so divided that those dealing with ophthalmology, and otolaryngology, pediatrics, internal medicine, dermatology and allergy run consecutively. In addition the study groups are arranged on the basis of previous registration. In this way, as soon as the registrations are completed, the registrant is expected to write the group leader and tell him what questions he wants brought up in the discussion. Attention is also called to the fact that during these last two days almost every type of instructional method is employed. Special lectures by outstanding authorities, study groups, pictures, demonstrations, symposia and panel discussions.

Although the program is most intense, informality and an emphasis on the practical marks the conduct of the whole meeting. Good fellowship at luncheon, dinner and smoker reigns throughout the two days. The meeting offers an exceptionally fine opportunity to meet and to come to know many distinguished authorities in this rapidly advancing but new field of medicine. The Forum is proud of the program which it is to present this year.

INFECTIOUS DISEASES IN LOUISIANA

The Louisiana State Board of Health reported that for the week ending October 9 the number of reportable diseases that occurred in figures greater than ten was remarkably small. There were listed 23 cases of pulmonary tuberculosis, 17 of measles, and 10 of typhus fever. The latter cases were scattered throughout the state, four of them being reported from Orleans Parish. In this week there were also reported two cases of poliomyelitis and three of undulant fever. For the week of October 16 there were listed 47 cases of pulmonary tuberculosis, 12 of malaria, and 10 each of scarlet fever, septic sore throat, and typhus fever. Again the typhus fever cases are reported from various parishes, no one having more than three cases. Listed as other diseases were 10 cases of unclassified pneumonia. For the week which terminated October 23, no diseases occurred in numbers greater than 10 except pulmonary tuberculosis of which 25 cases were reported to the State Board of Health. In this week there were found six cases of typhus fever, two of undulant fever, and one of poliomyelitis. For the last week in the month, October 30, pulmonary tuberculosis again was first with 26 cases, with 22 cases of malaria also being reported this week as the only two diseases which occurred in numbers greater than 10, except 20 cases of unclassified pneumonia. Twenty of the cases of malaria came from Jackson Parish. There were reported also four cases of typhus fever. The week ending November 6 was the week in which the venereal diseases were reported. For the previous month there were listed 2,329 cases of syphilis, 1,482 instances of gonorrhea, 73 of chancroid, 22 of lymphopathia venereum. The non-venereal diseases included 42 cases of tuberculosis, 15 of cancer, and 11 of typhus fever. Also were 16 cases of unclassified pneumonia. The majority of the cases of typhus fever were reported from Orleans Parish, with seven. Three cases of poliomyelitis were reported this week and four of malaria. Roughly about half of the cases of syphilis, about a third of the cases of gonorrhea, and about a sixth of the lymphopathia venereum were reported from military sources.

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reported that for the week which ended October 16 in the City of New Orleans, there were 135 deaths divided 85 white, 50 "all others." Twelve of these deaths were in children under one year of age. The following week the figures were almost exactly the same, there being one more death in the city than in the previous week. There were seven less white deaths and eight more deaths in colored people in this week. Praiseworthy was the fact that there were only seven

deaths in children under one year of age. For the week which terminated October 30, the 129 deaths that took place in the city were apportioned 90 white, 39 "all others," with nine deaths in children under one year of age. For the week which closed November 6, there was a rather sharp increase in the number of deaths in the City of New Orleans when 156 of the citizens succumbed as a result of disease or injury. This increase in part was due to the fact that there were 30 more deaths among the negroes listed than the previous week, but there were three less in the white population. Twenty-four children under one year of age died this particular week. The three year average for the corresponding week is 139 deaths. However, it must be borne in mind that the city has increased considerably in population since 1940.

DEATH OF CAPTAIN BAIRD

It is with regret that the Journal is informed that just prior to the publication of the paper "Pneumonia in the Army" by Lt. Colonel E. V. Allen and Captain Lester W. Baird, the latter died while in active service.

DR. H. E. BERNADAS

The following resolutions were passed at the meeting of the Executive Committee held on October 1, 1943:

WHEREAS, The untimely hand of death has taken from our midst our beloved comrade and sage counselor, Dr. Hector E. Barnadas, and

WHEREAS, In so doing, his untimely death has deprived us of his calm, deliberate judgment and sound advice, always given freely and with mature judgment, and

WHEREAS, With his departure from our midst a vacancy will be left, which not even time can fill, as his genial dispostion and sterling qualities will always be missed, and

WHEREAS, Our Council in which he was an honored member and chairman for many years will always look upon his vacant chair as the chair of a man who always held high the precepts of ethics in organized medicine;

THEREFORE BE IT RESOLVED, That we the members, officers and Council of the Louisiana State Medical Society, express our deepest and most sincere condolence to Mrs. Bernadas and the members of his family for the irreparable loss to them of a beloved husband and father. To them we say, in your hour of sorrow we feel for you and with you. So noble a gentleman was naturally a loving husband and father. Although never can his loss be replaced, may the assauging hand of time mellow and gentle the blow which is now so hard to bear.

DR. ERWIN LOWE GILL
(1901-1943)

The many friends of Dr. Erwin L. Gill of Shreveport were shocked to hear of his sudden death as a result of suffocation from fire when his home burned down on October 31. Dr. Gill was one of the active practitioners in Shreveport. He graduated from Tulane in 1926 and thereafter served an internship in the Charity Hospital. He is survived by his widow and his son.

BOOK REVIEWS

Physiological Regulations: By Edward F. Adolph. Lancaster, Pa., The Jacques Cattell Press, 1943. Pp. 502. Price, $7.50.

This monograph is neither a survey nor a review. It is, as the author states, a report of an investigation that become too extensive for presentation in a journal. As such, it is an unusual report which deserves the attention of all serious students interested in physiology in its broadest aspects. Written in the best tradition of J. S. Haldane and L. J. Henderson, to whom it is dedicated, the monograph is an attempt to visualize on a quantitative basis "what organisms do to maintain constancy not only of composition but of energies, forces, structures and functioning."

The book is divided into two parts. Part A deals with water regulation in animals. Beginning with the dog, the author presents and analyzes data showing the pattern of the regulation of its water content, intake and output, as seen under different experimental conditions. Much of the material is taken from the author's own experiments. These were devised so as to provide for the measurement not only of the content of water and its change in relation to time, but also of all exchanges of water (gains and losses) in relation to increments in content of water. Careful analysis of the available data showed that in all excesses, losses are faster than gains. In all deficits, gains are faster than losses; thereby balance is recovered. Man, frog and many other species of animals, including several of the invertebrates, as well as organs, tissues and cells, are shown to have a pattern of equilibration similar to that of the dog.

Part B is devoted to analysis of data on heat, glucose, oxygen, carbon-dioxide, lactate, frequency of heart beat, and blood pressure. The pattern of equilibration is shown to be similar to that of water. Study of the inter-relations of several components of one organism and the simultaneous handling of components by that organism to mani-

fest the compatibilities and preferences in the contents and exchanges of each. Thus frequency of heart beat is, after a disturbance, stabilized in about six minutes, heat content only after two hours. "But their recoveries are not independent; rather the organism is constituted in such a manner that every component falls into an order relative to every other." The author concludes that the answer to the question as to what animals do to maintain their physiological constitutions and activities can be summarized in a sentence: "Animals preserve their constitutions and activities like themselves within the limits of variation that characterize the normal, either by preventing disturbances from occurring or by compensating for each actual and incipient departure from normal."

The latter part of the book is given over to a discussion of choosing physiological variables, the meanings of regulation, and some speculations concerning regulations. The reader who lacks the time or the interest to study the details presented will find the summaries which concludes each chapter adequate to enable him to follow the carefully developed induction arguments which lead to the broad and stimulating generalizations at the end of the book.

H. S. MAYERSON, Ph. D.

Man in Structure and Function: By Fritz Kahn, M. D. (Translated and edited by George Rosen, M. D.). New York, Alfred A. Knopf, 1943, 2 vols., Pp. xxxix + 742 + xiv, figs. 461. Price, $10.00.

This work, originally published in German under the title "Der Mensch Gesund und Krank," is designed for the lay reader. It is a survey of the construction of the human body, with emphasis on functional considerations and maintenance of health.

The forty-nine chapters are grouped in ten sections, the headings of which wil indicate the subjects treated: From electron to man (a consideration of the structure and fundamental biological activities of cells, together with a brief outline of embryology), skeleton, musculature, circulation of the blood, respiration, digestion, nutrition, nervous system, skin and the sensory organs, sex life. Simplicity of style is an outstanding feature of the text, which has a liveliness promising an appeal to the average reader. Complex structures and functions are made more readily understood by comparisons with objects and processes familiar in everyday life. Dimensions and other quantitative data likewise are translated, by the use of homely analogies, into terms of ordinary experience. The reader will profit also from the abundant illustrations. These pictures, in common with the text, are so planned as to attract and hold interest. Some of them are conventional illustrations, while in others the interesting unorthodox composition presents structures as if they were in an anatomical fairyland. Thus, the growth of a bone is strikingly depicted in the form of a battle: "Blood vessels advance against the cartilage with young connective-tissle cells (warriors). The cartilage cells armour themselves with calcium, but are defeated and flee . . ." References to hygiene are sensibly chosen and plainly stated, the following being representative: "It is useless for the layman to pay any unnecessary attention to his blood-pressure. His blood-pressure is like bald-headedness—some people get it and others do not. There are families in which the members have a tendency to high blood pressure. If one belongs to such a family, the chances that one will succumb to hypertension are greater. Slight deviations from the normal blood-pressure level at a particular age are of little significance. As long as there is no pathological increase, the blood-pressure furnishes no standard by which to estimate the physical ability of an individual or his probable length of life. However, an individual with a pathologically high blood-pressure resembles a person who is excessively overweight; such a person is functionally less capable and in greater danger than a normal one. Effective remedies against high blood-pressure have not yet been found. The best remedy available at present is a healthy mode of life, which should begin while one is still young, and not when it is too late and the blood-pressure is already pathologically high."

For the intended purpose, these volumes may be recommended as a vivid account of the elements of human biology and hygiene. The occasional factual errors, which might be expected in any work of its kind, are of little consequence in view of the objectives of the book.

HAROLD CUMMINS, Ph. D.

Nasal Medication: By Noah D. Fabricant, M. D., M. S. Baltimore, The Williams & Wilkins Co., 1942. Pp. 122, figs. 20. Price, $2.50.

A count of drugs in the subject index of this book shows 99 drugs which are used for nasal medication. The abuse or benefit to the nose from the use of these various medicines is effectively discussed by Fabricant. The indiscriminant use of drugs which have an adverse effect on nasal physiology is condemned.

The book is a step in the right direction but one feels that frequent revisions will be necessary to bring it abreast of the constant good, bad and indifferent additions to nasal therapy.

H. L. KEARNEY, M. D.

The Physiological Basis of Medical Practice: By Charles Herbert Best, M. A., M. D., D. Sc. (Lond.), F. R. S., F. R. C. P. and Norman Burke Taylor, M. D., F. R. S. (Canada), F. R. C. S. (Edin.), F. R. C. P. (Canada), M. R. C. S. (Eng.), L. R. C. P. (Lond). 3d ed. Baltimore,

The Williams and Wilkins Company, 1943. Pp. 1942. Price, $10.00.

This textbook, first published in 1937, has become the standard and most popular work in physiology. The second edition appeared in 1939 and entailed an extensive revision and the addition of much new material. The present revision is, perhaps naturally, less extensive, but enough new material has been worked in to increase the size of the book by about 60 pages. There are still many typographical errors and a few obviously wrong statements which have been carried over (some from the first edition). The practitioner will find this text, linking together the preclinical subject of physiology and that of medical practice, well worth owning.

H. S. MAYERSON, PH. D.

The Principles and Practices of Industrial Medicine: Edited by Fred J. Wampler, M. D. Baltimore, The Williams & Wilkins Company, 1943. Pp. 579. Price $6.00.

This book, edited by an experienced teacher of industrial medicine, is well planned and executed. The thirty-two men and women, who, in addition to the editor, have contributed chapters to the book, are experienced persons active in the various fields of industrial work, who have written clearly and precisely. Especially effective are the chapters on the effects of temperature, humidity and abnormal atmospheric pressure on industrial workers by Anna M. Baetjer, Sc. D., and lighting and vision by Matthew Luckeish, M. D. and Frank K. Moss, E. E. The numerous tables, graphs and charts of the entire book are well chosen, easily interpreted and decisive. Each chapter is followed by a carefully selected reference list and the book is well indexed.

Throughout the text attempts have been made to correlate the principles of industrial medicine with its practice. By the success of these attempts another good book has been contributed to the rapidly growing list of texts on industrial medicine.

RALPH H. HEEREN, M. D.

Hope Deferred: By Jeannette Seletz. New York, The Macmillan Co., 1943. Pp. 536. Price, $2.75.

This is a novel which has to do with life in a medical school and a great hospital. Although written by a lay individual, evidently the authoress is thoroughly familiar with medical students and their way of living and with hospital life in general; either this, or else she has had an excellent critic check up on the various things medical which enter into the novel.

The book is interesting and those who read it will probably enjoy a pleasant few hours, although pleasure will be all they will obtain, as, to say the east, the book is quite light.

The hero of the book and many of his friends seem to be living a life of continuous emotional upheaval. These psychological upsets do not occur, certainly in the great majority of medical students. Most of them do not turn pale and have all kinds of psychic and physical reactions when they first enter the dissecting room or see an operation or examine their first patient. Life in the hospital presents another series of mental turmoils. The lay reader will probably get the impression from this story that hospital life is secondarily concerned with the care of the patient and primarily with sexual problems of a personal nature concerning the people who conduct the institution. The technical points of hospital life are well pictured but certainly a hospital in which the personnel is so strongly motivated by sex, will not function efficiently. Certainly this hypothetical hospital is not like the average hospital or probably any hospital. However, the tale had to be unfolded and a story written so that the reader would be interested. This the authoress has managed to bring about. To the reviewer the sexuo-emotional phase of the book was rather tiresome. Elsewhere the remainder was most readable and entertaining.

J. H. MUSSER, M. D.

PUBLICATIONS RECEIVED

W. B. Saunders Company, Philadelphia and London: A Textbook of Medicine by American Authors, Edited by Russell L. Cecil, A. B., M. D., Sc. D., 6th ed. Internal Medicine in General Practice, by Robert Pratt McCombs, M. D.

The Williams and Wilkins Company, Baltimore: Reaction to Injury, by Wiley D. Forbus, M. D. Synopsis of Tropical Medicine, by Sir Philip Manson-Bahr, C. M. G., D. S. O., M. D., F. R. C. P.

New York Academy of Sciences, New York: Annals of the New York Academy of Sciences, Volume XLIV, Art. 3, pages 189-262, Parasitic Diseases and American Participation in the War.

National Live Stock and Meat Board, Chicago, Illinois: Ten Lesson on Meat for Use in Schools.